APRIL 29, 1957

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

WHAT'S AHEAD for the Auto Industry?

For keys to the thinking of GM's Harlow Curtice and other industry leaders, see page 135

✔ **Steel — F.O.B. Toledo? . . . page 125**

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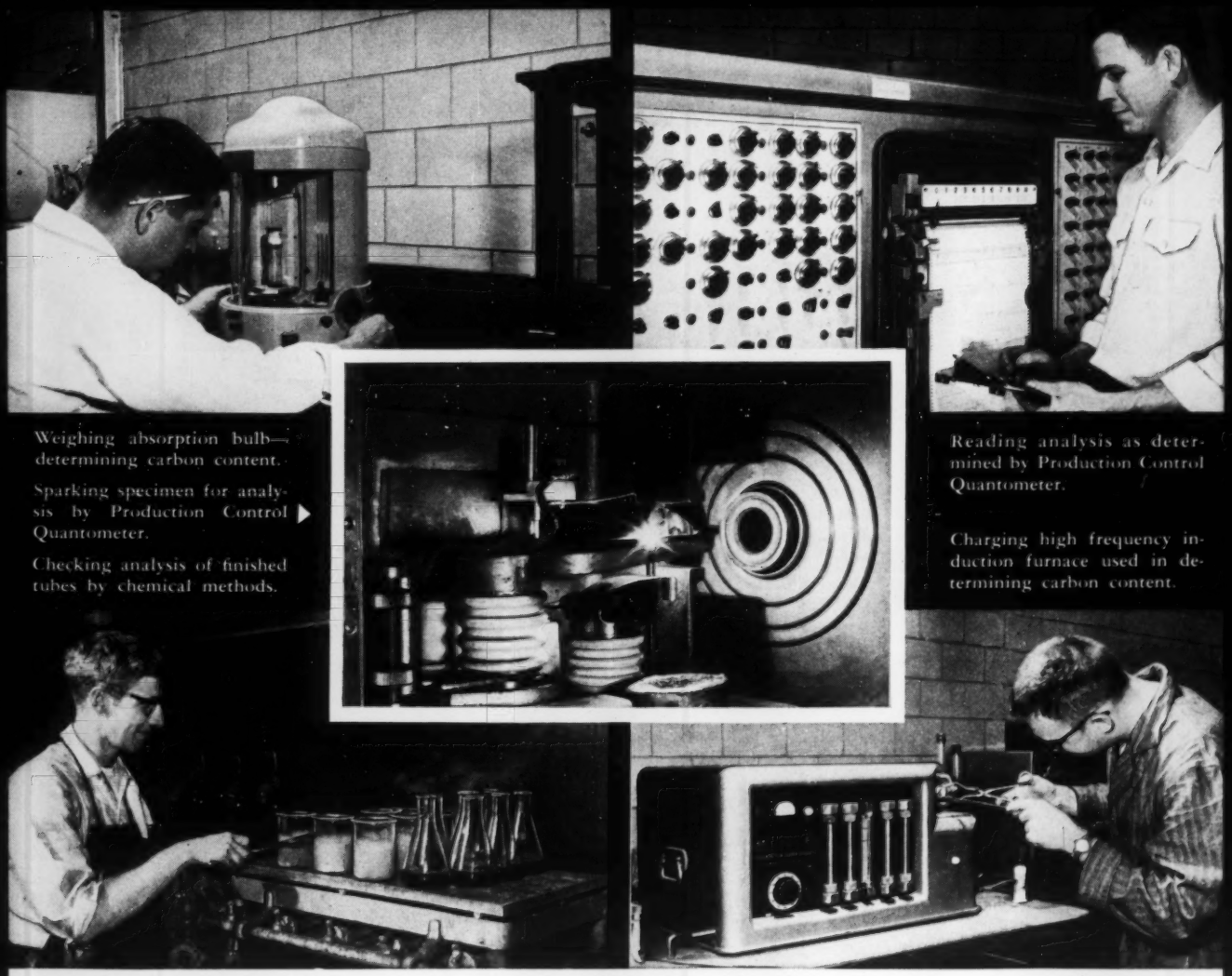

Weighing absorption bulb—determining carbon content.

Sparking specimen for analysis by Production Control Quantometer.

Checking analysis of finished tubes by chemical methods.

Reading analysis as determined by Production Control Quantometer.

Charging high frequency induction furnace used in determining carbon content.

THE O.K. YOU DO NOT SEE IS YOUR GUARANTEE

The key to the physical and mechanical characteristics of any steel lies in its analysis. Tensile strength, corrosion resistance, resistance to "creep" at elevated temperatures, reaction to heat treatment—to name a few—are largely determined by composition.

Through B&W's analytical laboratories pass the tubing destined for practically every known type of pressure or mechanical application—hundreds of different steels—each with its own particular characteristics—and checked by technicians who know their job and using the most advanced laboratory equipment available anywhere.

Modern control methods, plus years of experience help to make the B&W laboratory "O.K." the invisible hallmark of tubing quality—and is your assurance of ease of fabrication and good service. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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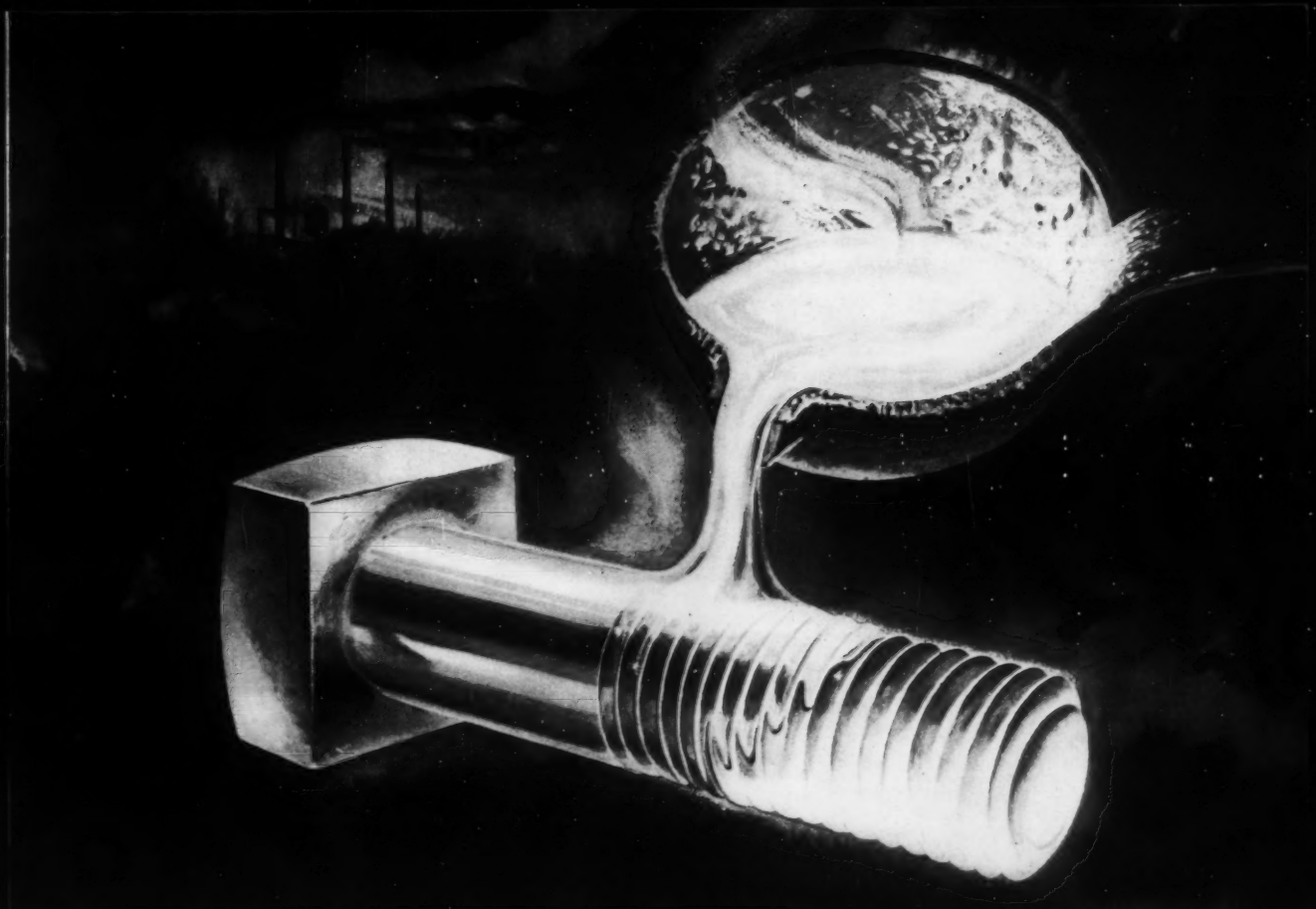


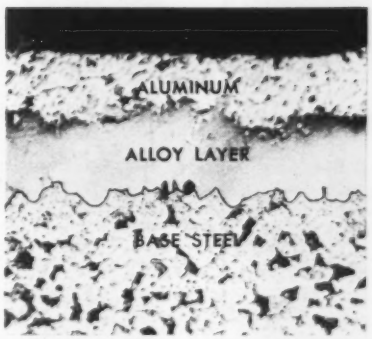
The illustration is symbolic — in practice, Bethlehem fasteners are dipped in molten aluminum, then centrifuged, producing a coating that is uniformly smooth over the entire surface.

Bethalume Coating for Fasteners is Superior in Corrosive Atmospheres

Looking for longer service life from steel fasteners exposed to corrosive conditions? Use fasteners which are protected by Bethlehem's Bethalume coating — the hot-dip aluminum coating which, in equal thicknesses, outlasts zinc in most corrosive atmospheres.

With Bethlehem's new coating facilities, fasteners of virtually all types and sizes can be coated with a smooth layer of corrosion-resistant aluminum. Excess coating is removed quickly while in the molten state, leaving the coated threads clean and sharp.

If you would like to know more about the Bethalume coating for fasteners, and the long service life it makes possible in atmospheric and heat corrosion, just get in touch with the nearest Bethlehem office.



Section through Bethalume coating, showing aluminum overlay and iron-aluminum alloy layer.

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HOW FLASH-BUTT RESISTANCE WELDING IS USED TO FABRICATE PRESSURE VESSELS

Severe test program proves Sciaky techniques of resistance welding provide the safe welds necessary for assembling butane gas containers

In a program undertaken to determine the metallurgical advantages of flash-butt welding for joining half shells of butane gas containers, Sciaky has established the suitability—and superiority—of the process for this application. The flash-butt process offers a 100% strength factor compared to 80% for flame or arc welds.

Job Description

Figure 1 shows the half shell and the assembled container. The metal is deep drawn low carbon steel. The

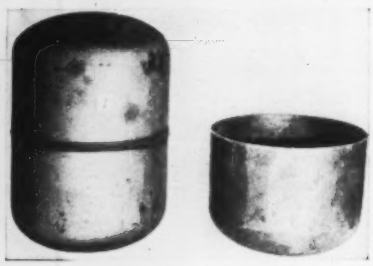

Fig. 1 At the right is a single half shell. At the left are the half shells joined by flash welding, flash not removed.

half shell has an I.D. of 11.6″ and an O.D. of 11.8″ or a cross-section of 3.63 sq. in.

Special clamps were developed so that the clamping pressure could be applied to a maximum surface of the parts to be welded. End and side views of the clamp arrangement are shown in Figure 2.

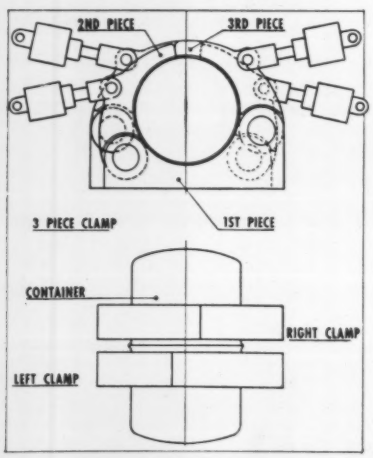

Fig. 2 Clamps for joining half shells.

The welder is a 300 KVA Sciaky Flash-Butt Welder with an upsetting force of 25,000 psi. Current is supplied to both the upper and lower clamping dies in order to assure uniform distribution throughout the diameter. One platen is fixed and the other movable. The flashing system is pneumatically operated and flashing time controlled by an adjustable metering valve.

A wedge cam provides the proper platen acceleration for flashing. A tap switch affords sixteen steps of heat regulation. Copper alloy clamping dies are used as locators and also serve as back-ups for the piece parts during the upsetting.

Test Results

The safety of the flash-butt welds was extensively tested under hydraulic pressure. Two such containers are shown in Figures 3 and 4 and for comparative purposes a fusion welded container in Figure 5.

Extensive metallurgical tests were also conducted from which the following conclusions were drawn:

1. Flash-butt welding makes it possible to obtain a strictly autogenous weld. This is true because the weld is made without the addition of extraneous material, and because the upsetting action displaces the melted base metal and impurities at the weld joint.
2. The flash-butt process makes it possible to obtain a joint having the same consistency on the inside and on the outside of the containers. See the macrographs, **Figures 6 and 7.**

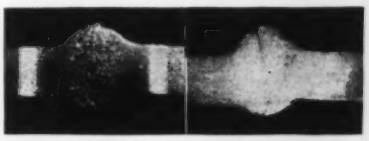

Fig. 6 Macrographs of flash welds before (left) and after annealing. Note consistency on both inside and outside.

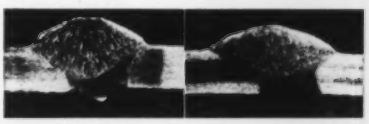

Fig. 7 Macrographs of arc welds before (left) and after annealing. Note irregularities on inside due to lack of penetration of extraneous material.

Complete Report Available

A complete, detailed report with extensive illustrations and the results of additional tests is available without charge. Please write on your company letterhead asking for the *"Engineering Report on Resistance Welding of Butane Gas Containers."* There is no obligation.

Fig. 3 Flash welded and annealed container which burst at 1349 psi. Weld elongation was 29.6%.

Fig. 4 Flash welded and annealed container which burst at 1278 psi. Weld elongation was 24.3%.

Fig. 5 Fusion welded and annealed container which burst at 994 psi. Weld elongation 11.6%.

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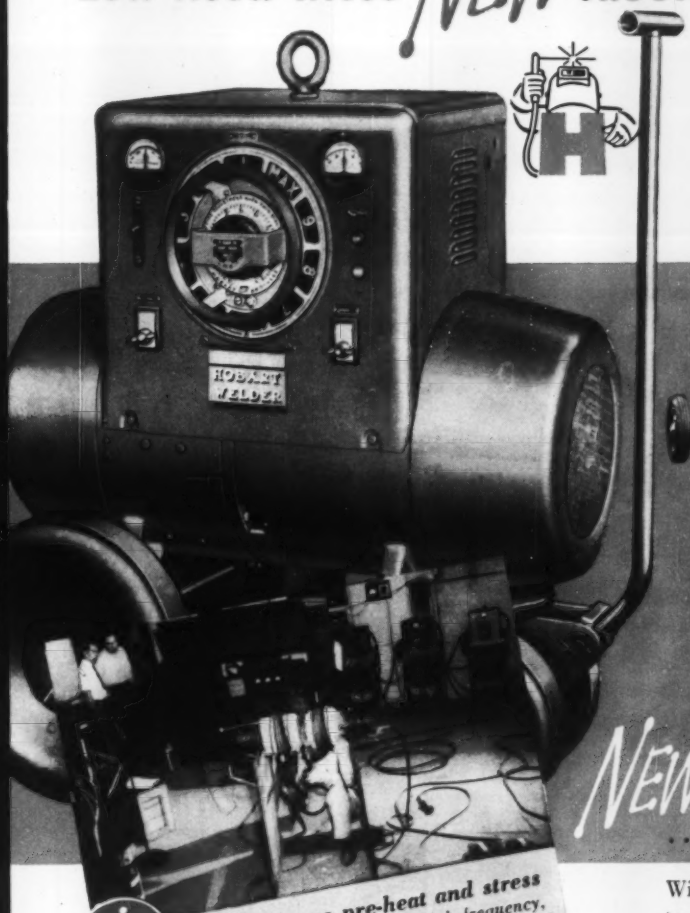

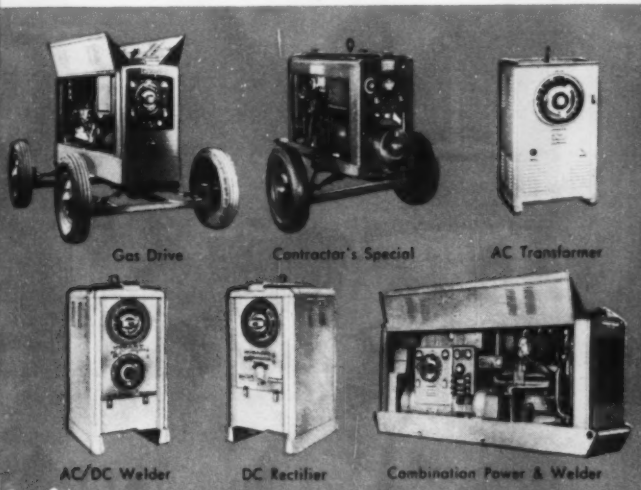

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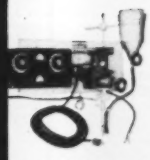

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It will pay you dividends in time, money, and cleaner metal to investigate and use ***HELSPOT*** in your operations.

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122

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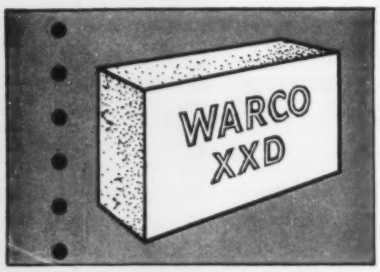

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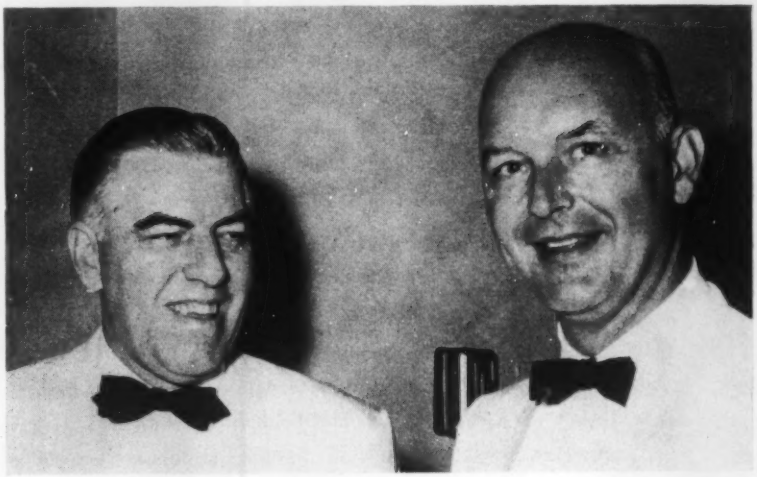


The smiling gentleman above in the Florida formal is Russell C. Jaenke, executive vice president, Penton Publishing Co., publisher of STEEL, *Machine Design, Foundry, New Equipment Digest* and *Automation*. He has just been elected chairman of National Business Publications Inc., the association of magazine publishers. The gentleman on the right is David C. Kiefer, business manager, STEEL.

Mr. Jaenke has been in the publishing business ever since he was business manager of Ohio State University's *Sun Dial*. Upon his graduation from OSU in 1926, he joined the Penton organization. He has been a space salesman, district manager, advertising manager for STEEL and vice president and director of advertising for all Penton publications. He has been executive vice president since 1955 and a member of the board of directors since 1937.

During the last eight years he has been active in NBP committee work, was named an NBP director in 1954 and vice chairman in 1956.

Plans Gone Awry?

The auto keys on this week's cover, together with a portrait of Harlow Curtice, boss of General Motors, suggests immediately that here is something about the automobile industry. "The spring upturn in auto sales," said Don Postma, Detroit editor, "wasn't quite as good as expected, so it looks like 1957 will be satisfactory but not sensational. Production is likely to hit 6.2 million. That situation poses several questions which this article will attempt to answer: Will the auto industry introduce 1958 models earlier than planned? What will GM, hardest hit in the '57 sales slump, do about '58? Has the position worsened for the two remaining independents?"

Anyway, we hope with GM and the others, that things will gooden considerably next year.

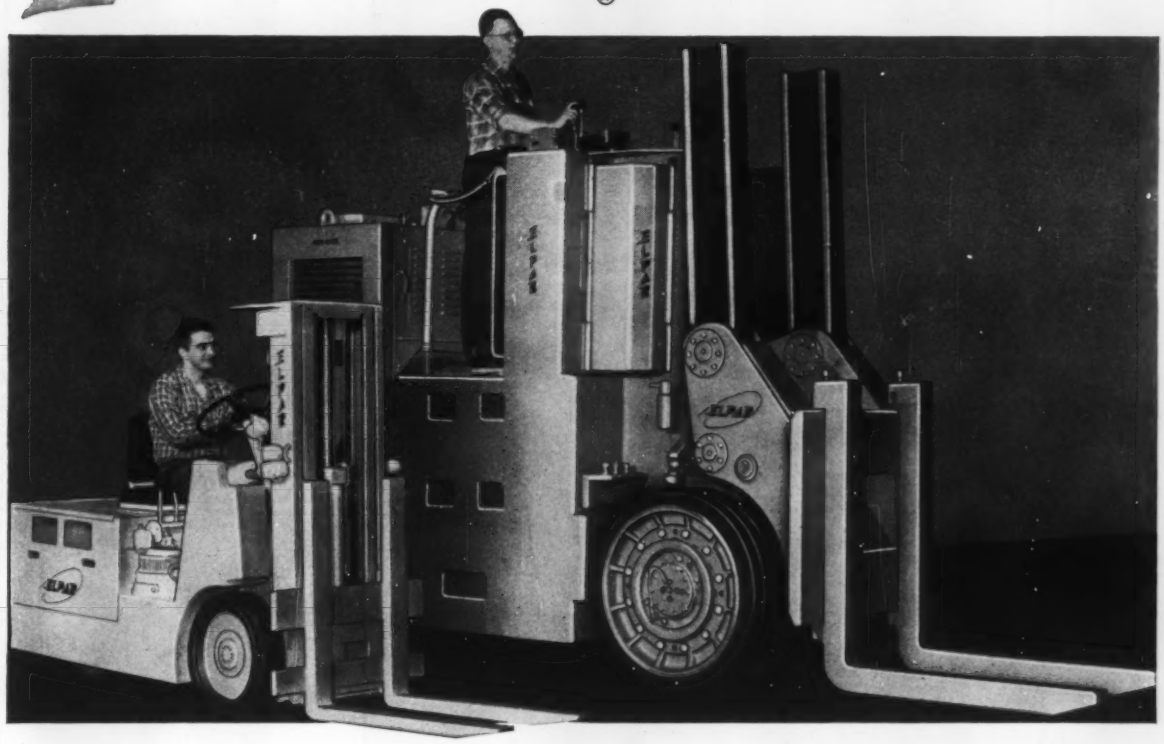
Banker Burjevski

H. L. Rittenhouse, Euclid Division, General Motors, was first in with a map acceptable to the emperor who wanted two spots whereon he might stand in three countries. Cometh now one Franik Burjevski, a cunning banker who offers 3 per cent interest on savings, compounded semiannually. He wanted more customers, so he made a new offer: To every new customer who opened a $1 account, he guaranteed to compound the interest continuously, that is to say at every instant throughout the year. Eju Drozdz, a vulpine character always on the lookout for a sure thing, pressed a dollar bill into Franik's hot little fist and spent the rest of the year planning how to spend his expected dividends. What was Eju's sum on deposit at the end of the year?

Shrdlu

(Metalworking Outlook—Page 115)

2 new ELPAR® Fork Truck Series



DOUBLE-DUTY

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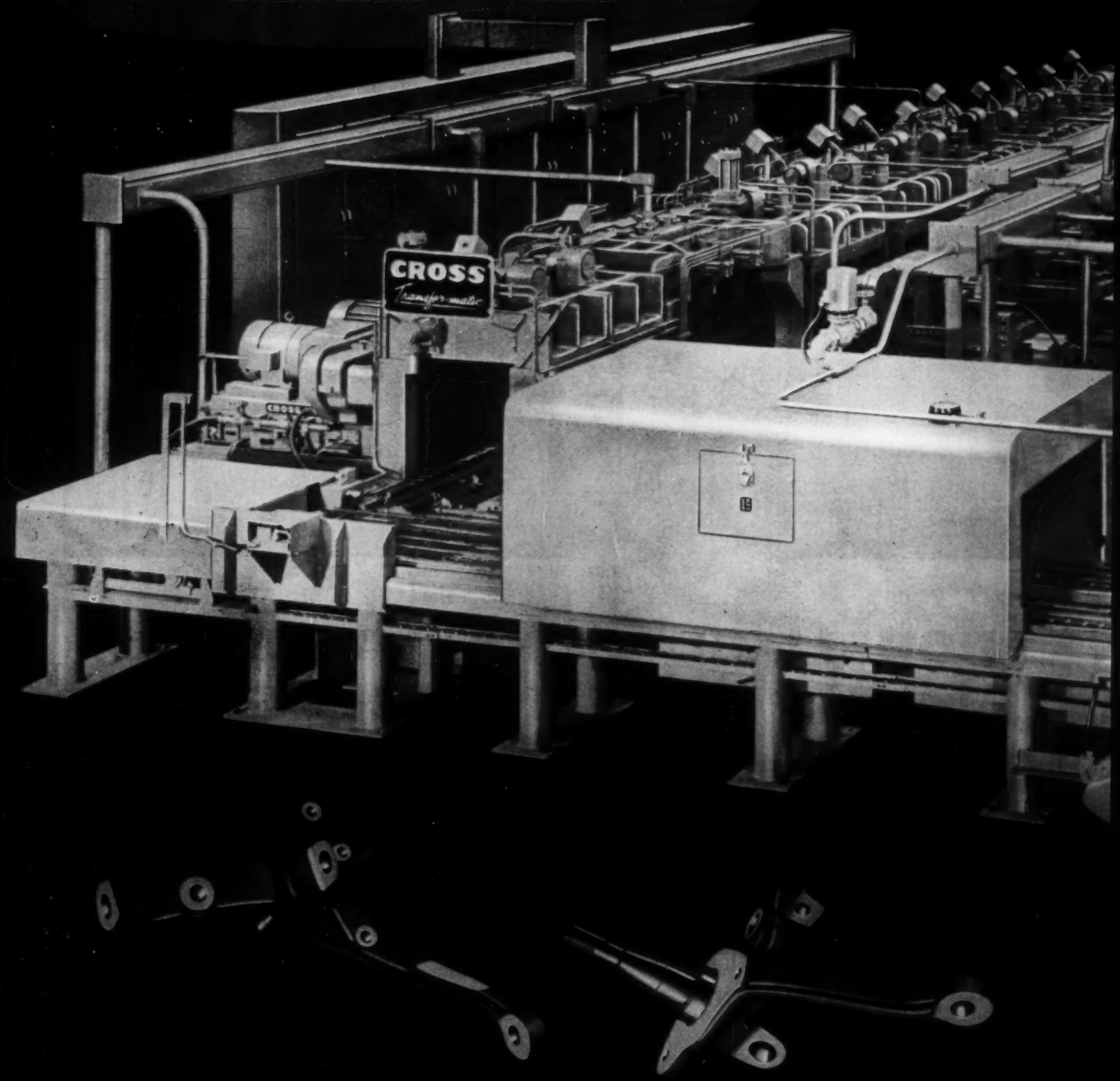

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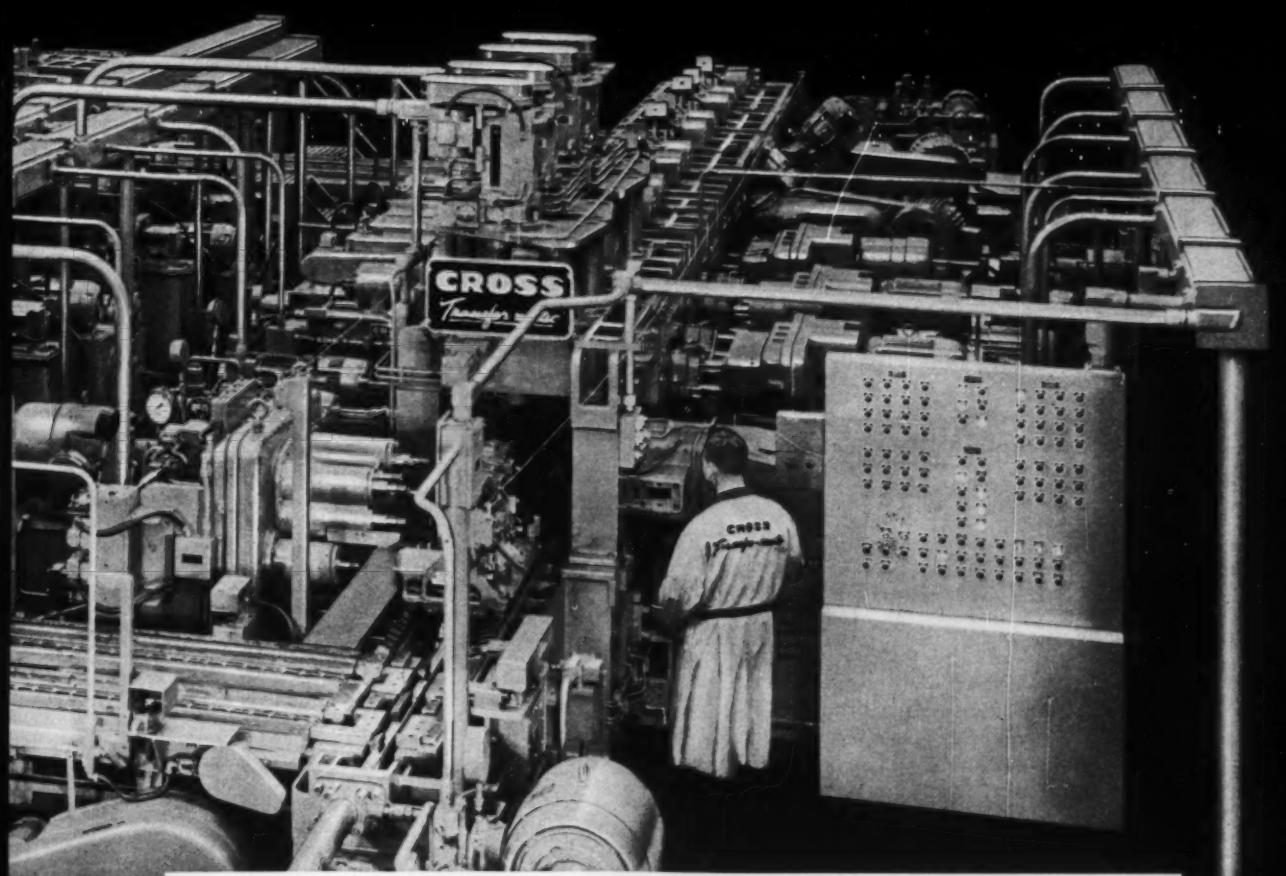

★ Straddle mills upper and lower support arm bosses; straddle mills steering arm boss; mills steering arm stop pad; mills spindle keyway; drills and taper reams upper and lower support arm holes and steering arm hole; drills, reams, chamfers and spotfaces two brake mounting plate holes; drills, counterbores, spotfaces, chamfers and reams brake anchor hole; drills spindle cotter pin hole; and threads wheel spindle.

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LETTERS
TO THE EDITORS

Reader Makes Budget Protest

Feeling serious about the need of economy in our government, I have written my views to the director of the budget and my congresssmen, as suggested by your editorial, "Our Bulging Budget" (Mar. 25, page 55).

I agree with your comments on the sluggishness of the administration in putting through the recommendations of the Second Hoover Commission. Furthermore, I deplore the trend toward gradually and greatly expanding the national budget with seemingly little control over the making of it by the administration.

Much is made of the efforts that presumably should be made by American industry to overcome the effects of increased labor rates on costs by greater productive efficiency. It is just as necessary for the executive departments to proceed under this rule rather than to accept, without question, constantly rising costs.

The people want more economy and efficiency in government. Unless that can be brought about, we are heading for serious trouble.

H. S. Ford
Vice President and General Manager
Bigelow-Liptak Corp.
Detroit

Selector Is Ideal Reference

Your up-to-date Welding Electrode Selector (Apr. 1 insert) is an ideal reference. The handy crossindexing system makes electrode selections an easy task. We will appreciate receiving a copy.

W. W. Fillmore
Assistant Chief Engineer—New York
Arabian American Oil Co.
New York

Alert to Price Changes

We are interested in your article, "Price Hikes Shape Up" (Apr. 8, page 59). We would like ten reprints for distribution to our purchasing divisions.

J. G. Mack
Vice President
Clark Equipment Co.
Buchanan, Mich.

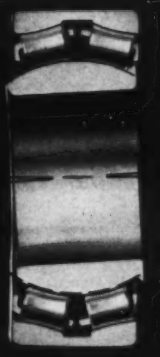
Sound Advice in Article

I have read with keen interest the article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93), the first in your 1957 Program for Management. I would appreciate six copies to pass along to others in our organization who may not have occasion to read your magazine.

I feel that you have compressed into

(Please turn to page 12)

self-aligning . . . CAN'T BIND



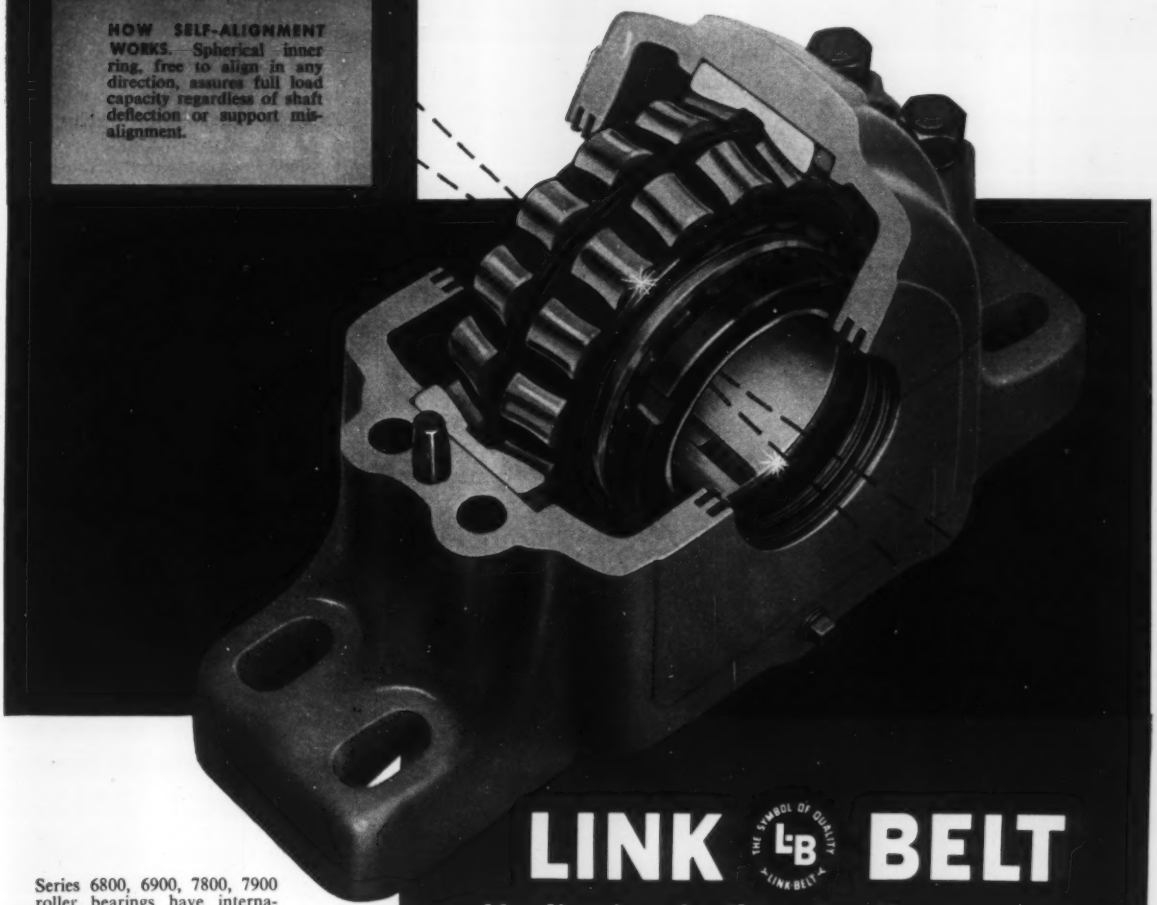
HOW SELF-ALIGNMENT WORKS. Spherical inner ring, free to align in any direction, assures full load capacity regardless of shaft deflection or support misalignment.

Husky bearings in husky housings adjust immediately in any direction

When high-impact loads deal out punishment, shaft deflection may spell a quick finish for ordinary bearings. But this rugged Link-Belt bearing is *self*-aligning . . . won't "pinch" or bind when misaligned.

Complete protection is provided by effective seals which block entrance of dirt, escape of lubricant. Durable housing—machined as two perfectly matched parts provides easy installation without shims or alignment rings.

Get full data on Link-Belt's complete bearing line from Book 2550. Ask any of 40 Link-Belt offices or one of our authorized stock-carrying distributors.



Series 6800, 6900, 7800, 7900 roller bearings have internationally standardized boundary dimensions.

LINK-BELT

self-aligning ball and roller bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.441

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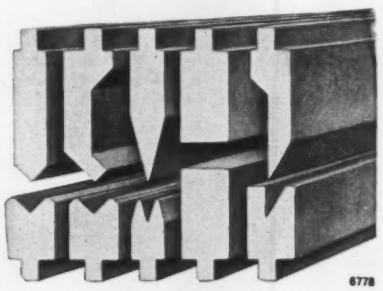
27
Dealers Offer Stock Deliveries

This country-wide organization of local dealers offers immediate delivery on many CHICAGO *induction hardened* press brake dies. These stock dies are economical, and the quick delivery saves time in tooling. They are available in any length from 4 to 12 feet in increments of 2 feet.

Stock dies are used for a surprisingly large variety of bending operations. And, with CHICAGO *induction hardened* dies you get bonus performance and increased die life at no extra cost. Remember, these dies can be used in any make or size of standard press brake.

On your needs for press brake dies, call your nearest dealer listed here. With Bulletin D-455 you can order by number. Ask for copy.



6778

*Induction hardening is a special, high-frequency process used to harden the wear surfaces of CHICAGO dies. Field reports on CHICAGO *induction hardened* dies show up to ten times longer life than conventional press brake dies.

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from page 10)

a remarkably short reading period a lot of sound reasoning and advice concerning the training of junior executives.

W. H. Steinberg
Sales Manager
Abrasive Wheel Department
Manhattan Rubber Division
Raybestos-Manhattan Inc.
Passaic, N. J.

Judging from your Letters to the Editors column of Mar. 11 (page 10), I am not alone in my interest in this article. Please send us three reprints.

Robert C. Lincoln
Senior Process Engineer
Joy Mfg. Co.
Claremont, N.H.

Important Data for Study

Thank you for the 85 copies of your 32nd Annual Financial Analysis of the Steel Industry (Apr. 1 insert). It, together with other data we have compiled about Inland and the steel industry, will be used by the University of Chicago executive program class in a business policy course.

We appreciate your co-operation in joining us in providing important data for study by this group of executive students.

C. L. Holmberg
Manager, Administrative Planning
Inland Steel Co.
Chicago

Properties for Ball Bearings

I have read with considerable interest your timely article, "Bearings for Tough Jobs" (Apr. 8, page 114). I would appreciate a reprint.

O. E. Cullen
Chief Metallurgist
Surface Combustion Corp.
Toledo, O.

Enjoys Reading Magazine

Please mail a copy of the excellent article, "How To Be a Junior Giant" (Apr. 1, page 62). I enjoy reading your magazine regularly.

J. A. Janson
Manager
Mfg. Division
Universal Milking Machine Division
National Cooperatives Inc.
Albert Lea, Minn.

Lauds Technical Tables

In the Oct. 29 issue, there was an article, "Machining Aluminum on the Automatics" (page 134), which has about the best tables we have seen on the machining of aluminum. If by this time your supply of reprints has not been exhausted, we would appreciate having several for our engineering department.

E. W. Brinkman
Sales Engineer
Davenport Machine Tool Co.
Rochester, N. Y.

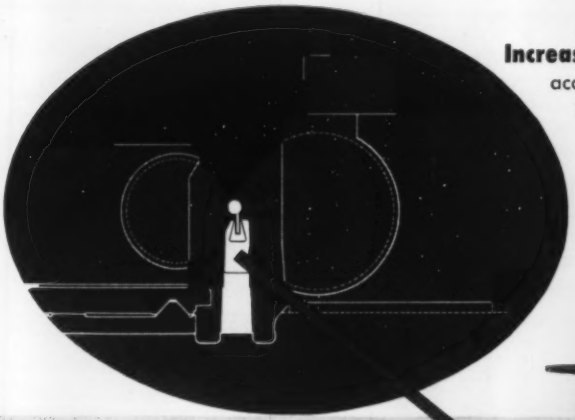
Source for Aluminized Sheets

Can you furnish us with a source of supply for aluminized sheets? We would also like information on properties and other data concerning this product.

F. E. Dilley
Purchasing Department
Lookout Boiler & Mfg. Co.
Chattanooga, Tenn.

• *The only producer selling aluminized sheets is Armco Steel Corp. They are made at its Butler, Pa. plant. For further information, we suggest you write Armco Steel Corp., Middletown, O.*

Exclusive Landis feature increases centerless production... permits heavier cuts without loss of finish or accuracy



Increased production with better finish and accuracy because the stationary work rest is anchored solidly to heavy, rigid bed.

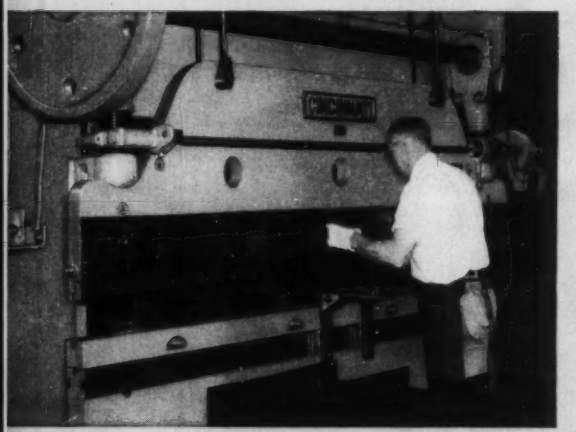
Landis No. 12
Centerless Grinder

condensed specifications	model #12	model #12½
Work capacity (diameter)	1/16"-3½"	½"-3½"
Standard Wheel Widths	4", 6", 8"	4", 6", 8", 10"
Wheel Drive Motors	15 hp. Max.	25 hp. Max.

LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

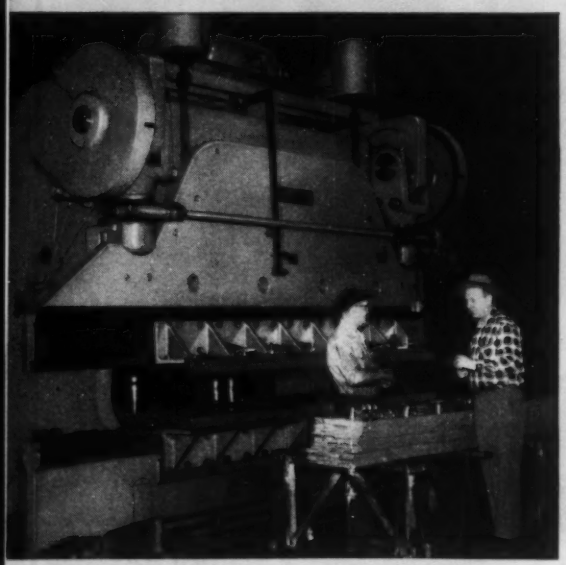
Punching and forming on accurate Cincinnati Press Brakes

. . . at NEW HOLLAND MACHINE CO., New Holland, Pa.



Tool boxes for New Holland Balers are shown being formed on this 8', 90 ton Cincinnati Press Brake.

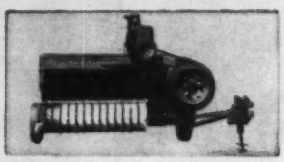
A setup for punching is shown being made on this 10' 335 ton capacity Cincinnati Press Brake.



Three Cincinnati Press Brakes are profitable producers in this finely equipped plant. Some of the standard features which contribute to the accuracy of these versatile machines are:

- All-steel interlocked construction (no welds used as load supports).
- Rigid, deep beds and rams insure accurate, uniform performance.
- Centerline loading eliminates weaving of frame and cramping of slides and guides.
- Tilting ram adjustment is useful for fade-out work—micrometer indicators make it easy to reset ram parallel to bed.
- Automatic pressure lubrication system insures proper oiling.

Write Department C for Catalog B-4R, and consult our Application Engineering Department about your production problems.



This Hayliner 68 Baler is just one of the many fine New Holland products made with the aid of Cincinnati Press Brakes.

This 10′ Cincinnati Press Brake has a capacity of 150 tons, and is shown forming frame angles from $\frac{3}{16}$″ steel.

Photos courtesy of New Holland Machine Co., New Holland, Pa.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

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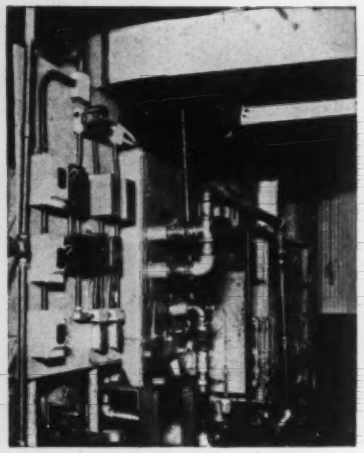

NIAGARA *Aero*
HEAT EXCHANGER
***quickly* pulls down the initial peak load of heat in quenching... and saves cooling water**

● You gain in accurate control of quench bath temperatures and quickly effective capacity to handle initial peak load of heat in quenching. You prevent production set-backs, increase the output of your heat treating department, prevent oil fires, save losses from rejected parts.

Niagara *Aero* Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletins 120 and 132 giving complete information.

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District Engineers in Principal Cities of U. S. and Canada

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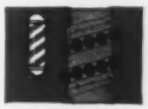
SAGINAW b/b SCREWS are guaranteed 90% EFFICIENT!

Require 4/5 LESS torque than Acme Screws for same linear output on Actuator and Positioner Applications! Saves space, weight!

WHAT IT IS AND HOW IT WORKS

Let's start at the beginning, with the familiar principle that there's far less friction in *rolling* than in *sliding*. By applying this principle,



Like stripes on a barber pole, the balls travel toward end of nut through spiral "tunnel" formed by concave threads in both screw and mating nut.

the *Saginaw ball/bearing Screw* radically increases the efficiency of rotary-to-linear motion (and vice versa). Instead of *sliding*, mating surfaces *glide* on rolling steel balls.

At end of trip, one or more tubular guides lead balls diagonally back across outside of nut to starting point, forming closed circuit through which balls recirculate.

SIX DESIGN ADVANTAGES

1. Vital Power Savings. Permit much smaller motors with far less drain on electrical system, simpler circuitry.

2. Space/Weight Savings. Screws themselves are smaller, lighter; permit smaller motors and gear boxes; eliminate auxiliary equipment required by hydraulics.

3. Precise Positioning. Machine-ground type will position components far more precisely than hydraulics or pneumatics; tolerances on position are held within .0006 in./ft. of travel.

4. Temperature Tolerance. Normal operating range from —75° to +275° F.; in selected materials, will function efficiently as high as +900° F.

5. Lubrication Latitude. If lube fails, will still function with remarkable efficiency. Units have been built and qualified for operation without lubrication.

6. Fail-Safe Performance. Far less vulnerable than hydraulics; Gothic-arch grooves, yoke deflectors and multiple circuits provide added assurance against failure.

SAGINAW b/b SPLINE

Utilizing the same basic *gliding ball* principle, Saginaw has developed the *Saginaw b/b Spline* which radically increases the efficiency of transmitting or restraining high torque loads.

Averages 40 times lower friction coefficient than sliding splines!

It can be fitted with integral gears, clutch dogs, bearing and sprocket seats, etc., for use with a wide variety of electrical units. Units have been built from 3 inches to 10 feet long—⅜ to 6 inches in diameter.

Available in custom machine-ground and stock rolled-thread types. Units have been built from 1½ inches to 39½ feet long—⅜ to 10 inches in diameter.

Saginaw ball/bearing Screws & Splines

SAGINAW STEERING GEAR DIV., GENERAL MOTORS CORP., SAGINAW, MICH.

SEND COUPON FOR NEW 1957 ENGINEERING DATA BOOK

or see our section in Sweet's Product Design File

Saginaw Steering Gear Division, General Motors Corp.
b/b Screw and Spline Operation
Dept. 6N, Saginaw, Michigan

Please send new engineering data book on Saginaw b/b Screws and Splines to:

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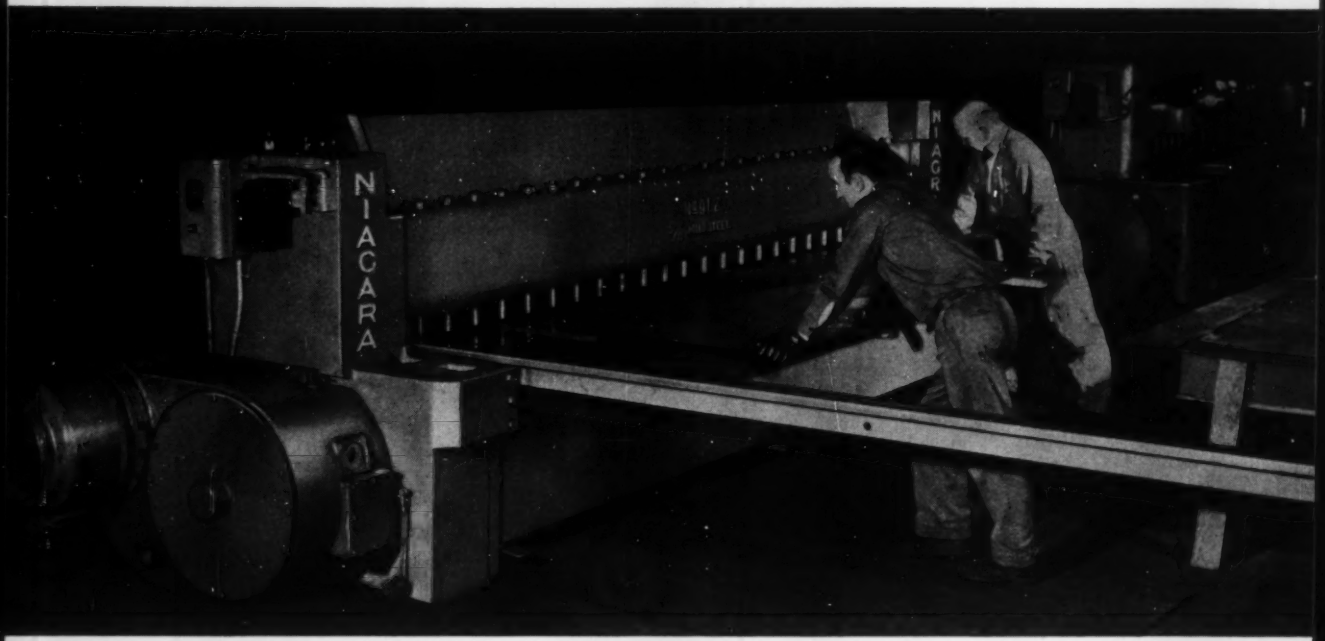
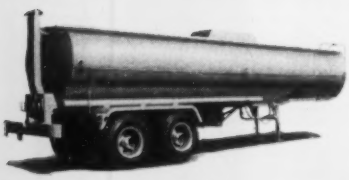
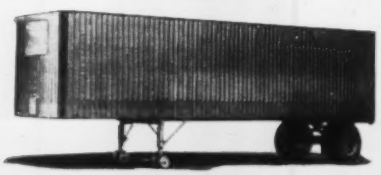
IN POWER SQUARING SHEARS...

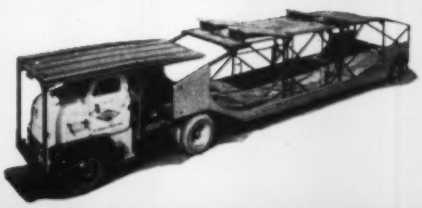
Fruehauf picks Niagara for



Niagara Model 912 shearing 18" x 30" transition plates from 10 gage hot-rolled steel for tank trailer frames.







Niagara Model 96 cutting forty 4" x 6" trailer gussets per minute from ⅜" and ½" bar stock.

Niagara Model 812 shearing 11 gage hot-rolled steel to 36" x 144" for trailer floor beams.

Niagara Model 812 at work shearing 24 gage stainless steel to 4' x 6'6" for van trailer door panels. Production: 2.7 pieces sheared all 4 sides per minute.

NIAGARA power squaring shears

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

"exceptional machine value"

World's largest trailer manufacturer spells out its reasons for using Niagara Underdrive Shears in producing a wide variety of parts from cold-rolled and hot-rolled steels, stainless and aluminum

As a metal fabricator, Fruehauf Trailer Company is well-qualified to speak. It not only manufactures every conceivable type of commercial trailer, but "builds more of them than any company in the world."

So, when it comes to power squaring shears, Fruehauf is particularly qualified to speak. Using several Niagara Models, it considers them an "exceptional machine value."

Enlarging on the point, Fruehauf engineers say, "Niagara Shears are capable of holding straight lines within thousandths of an inch . . . they keep their settings . . . trouble-free, they require a minimum of maintenance.

"They're well-balanced . . . can be moved about . . . require no special concrete base. We especially like their minimum height . . . can see over them. It's unlikely that an operator will step out from the shear in the path of a fork lift."

Like Fruehauf, progressive companies everywhere look to Niagara for exceptional machine value in a power squaring shear. Here are a few of the reasons:

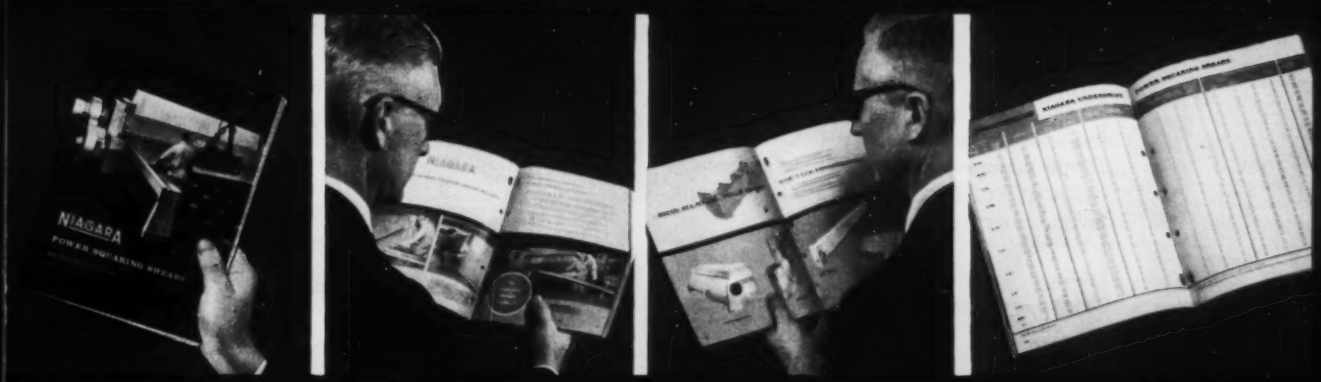
TAKE ACCURACY! Niagara's positive, power actuated, self-compensating holddown grips work securely. Fully closed box section construction of bed, crosshead, holddown and housings resists all stresses with minimum deflection.

TAKE SPEED! More working strokes per minute and instant engagement of Niagara's exclusive multi-point sleeve clutch assure more cuts per hour. Full visibility of the cutting line, ease of operation, quick setting gages and safety features boost hourly output.

TAKE MAINTENANCE! Niagara Shears are built to stand the gaff on the toughest jobs. Simplicity of design involving a minimum number of parts, and utmost accessibility cut out costly maintenance.

Any way you look at it, Niagara has the most to offer you in modern shear performance.

NIAGARA'S NEW, FACT-FILLED BULLETIN WILL GIVE YOU THE FULL STORY



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see what America's most modern power squaring shears can do for you

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

MAIL your new Underdrive Squaring Shear Bulletin 69G to us immediately.

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SM

here's how Seeburg matches P-K® fasteners to the job

And Parker-Kalon's wide range of types and sizes makes it possible

"By carefully selecting the right P-K screw for each assembly we've reduced rejects and stepped-up production," says Joseph Kamys, engineer of J. P. Seeburg, manufacturers of the famous line of Select-O-Matic "200" Coin Operated Phonographs.

◂ "Take the fastening of metal kickplates and base moldings to wood cabinets, for example. They must hold permanently and go in fast without splitting the wood. P-K Type-A Self-tapping Screws are just right for the job."

"In a metal-to-plastic application such ▸ as the fastening of high-frequency speakers to formed plastic housings—P-K Type-Z thread-forming Screws go in right without cracking the plastic—stay put, even under high vibration."

◂ "In this important subassembly, appearance is important as well as dependable holding power. Here we use P-K Type-A Phillips Recessed Head Screws in a metal-to-metal application."

Whatever your product or application . . . ferrous or nonferrous castings, sheet metal or structural steel, plywoods, asbestos compositions, pliable or brittle plastics . . . Parker-Kalon can furnish the proper fastener to speed assembly, reduce rejects, cut costs!

PARKER-KALON®
fasteners

Sold Everywhere Through Leading Industrial Supply Distributors.

***PARKER-KALON DIVISION,** General American Transportation Corporation. Factory: Clifton, New Jersey.*

Twin spindles Double work capacity

This arrangement uses a magnetic chuck to hold an automotive part for processing.

The Style 432 machine as fitted with an auxiliary slide for angular cuts.

XLO

EX-CELL-O FOR PRECISION

A single operator on this Ex-Cell-O Vertical can precision turn, bore, face, groove and chamfer two identical or completely different workpieces simultaneously. All operations may be performed singly or in combination, and don't overlook the loading ease and tool accessibility of this vertical boring machine.

Ex-Cell-O engineers have cut maintenance time to barest minimum by locating service parts within easy reach. Yet overall design of this machine is clean and compact.

No doubt you are interested in increasing your production output. Call your nearby Ex-Cell-O representative for a conference today. His suggestions cost you nothing—and may save you a considerable sum. Or get in touch with Ex-Cell-O in Detroit directly. We would appreciate the opportunity of putting our years of specialized experience in the machine tool field at your disposal.

EX-CELL-O
CORPORATION
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MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING & BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS & BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT & MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

200 SERIES STAINLESS STEEL PRODUCTION IS REALLY ROLLING–

with ELECTROMET Alloys

Demand is growing for the Cr-Ni-Mn 200-series stainless steels. They are popular and economical for such products as kitchen utensils, appliances, truck bodies, and automobile trim. ELECTROMET helps steel producers meet this growing demand with a *variety* of alloys designed to suit specific melting requirements.

FOR EXAMPLE...

The popular alloys for the addition of nitrogen in 200-series production are ELECTROMET nitrogen-bearing electrolytic manganese, SIMPLEX nitrogen-bearing ferrochrome and nitrogen-bearing low-carbon ferrochrome.

For the addition of manganese–ELECTROMET electrolytic manganese metal, low-carbon ferro-manganese, and MANSILOY alloy are the favorites.

And, of course, ELECTROMET offers the largest selection of chromium alloys, including–"EM" ferrochrome-silicon; low- and medium-carbon ferrochrome; SIMPLEX low-carbon ferrochrome; low-chromium and regular grades of high-carbon ferrochrome; and charge chrome.

The 200-series stainless steels are the result of basic work carried out at the ELECTROMET Research Laboratories. Stainless steel producers have been granted royalty-free licenses under the patents covering these developments.

For full information contact the nearest ELECTROMET office.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N. Y.

Offices: Birmingham • Chicago • Cleveland
Detroit • Houston • Los Angeles
Phillipsburg, N. J. • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company,
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FERRO-ALLOYS AND METALS

"Electromet," "EM," "Mansiloy," and "Simplex" are registered trade-marks of Union Carbide.

Cr-Ni-Mn 200-series stainless steels are becoming increasingly popular for both household and industrial products fabricated from stainless strip. Here the final pass on finishing rolls gives surface finish and hardness to the strip.

CALENDAR
OF MEETINGS

Apr. 29-May 1, Association of Iron & Steel Engineers: Spring conference, Hilton Plaza hotel, Cincinnati. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 29-May 1, Chamber of Commerce of the U.S.: Annual meeting, Washington. Chamber's address: 1615 H St. N.W., Washington 6, D. C. Executive vice president: Arch N. Booth.

Apr. 29-May 3, National Materials Handling Exposition: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Apr. 30-May 1, Metal Powder Association: Annual meeting and exhibit, Drake hotel, Chicago. Association's address: 130 W. 42nd St., New York 36, N. Y. Secretary: Kempton H. Roll.

Apr. 30-May 2, Investment Casting Institute: Annual spring meeting, Sheraton Park hotel, Washington. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

May 1-3, Electronic Components Symposium: Morrison hotel, Chicago. Information: J. S. Powers, Electronic Components Symposium, 84 E. Randolph St., Chicago 1, Ill.

May 1-3, Society for Experimental Stress Analysis: Annual meeting, Hotel Statler, Boston. Society's address: P.O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

May 5-7, National Tool & Die Manufacturers Association: Spring meeting, Mayflower hotel, Washington. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

May 5-9, American Ceramic Society: Annual meeting, Statler Hilton hotel, Dallas. Society's address: 4055 N. High St., Columbus, O. Secretary: Charles S. Pearce.

May 6-8, Air Conditioning & Refrigeration Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 1346 Connecticut Ave. N.W., Washington, D. C. Managing director: George S. Jones Jr.

May 6-10, American Foundrymen's Society: Annual meeting and first engineered castings show, Music Hall, Cincinnati. Society's address: Golf and Wolf roads, Des Plaines, Ill. Secretary: William W. Maloney.

May 7-12, National Association of Architectural Metal Manufacturers: Annual convention, Fairmont hotel, San Francisco, Calif. Executive secretary: William N. Wilson.

May 8-10, American Management Association: Spring insurance conference, Hotel Statler, New York. Association's address: 1515 Broadway, New York 36, N. Y. Secretary: Andrew P. Donovan.

May 8-10, American Steel Warehouse Association: Annual meeting, Roosevelt hotel, New Orleans. Association's address: 442 Terminal Tower, Cleveland 13, O. Executive secretary: Robert G. Welch.

May 12-15, Automotive Engine Rebuilders Association: Annual convention, Sheraton-Cadillac hotel, Detroit. Association's address: 419 N. Capitol Ave., Indianapolis 4, Ind. Executive vice president: R. G. Patterson.

May 12-15, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 3, Ill. Secretary: Arthur C. Kreutzer.

A Conco engineered Crane is top management's idea of value. Quality like this means minimum maintenance cost, slow depreciation, tailored-to-the-job engineering, reduced accident hazards. Conco engineered Cranes reflect the more than 37 years experience that lies behind them. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.
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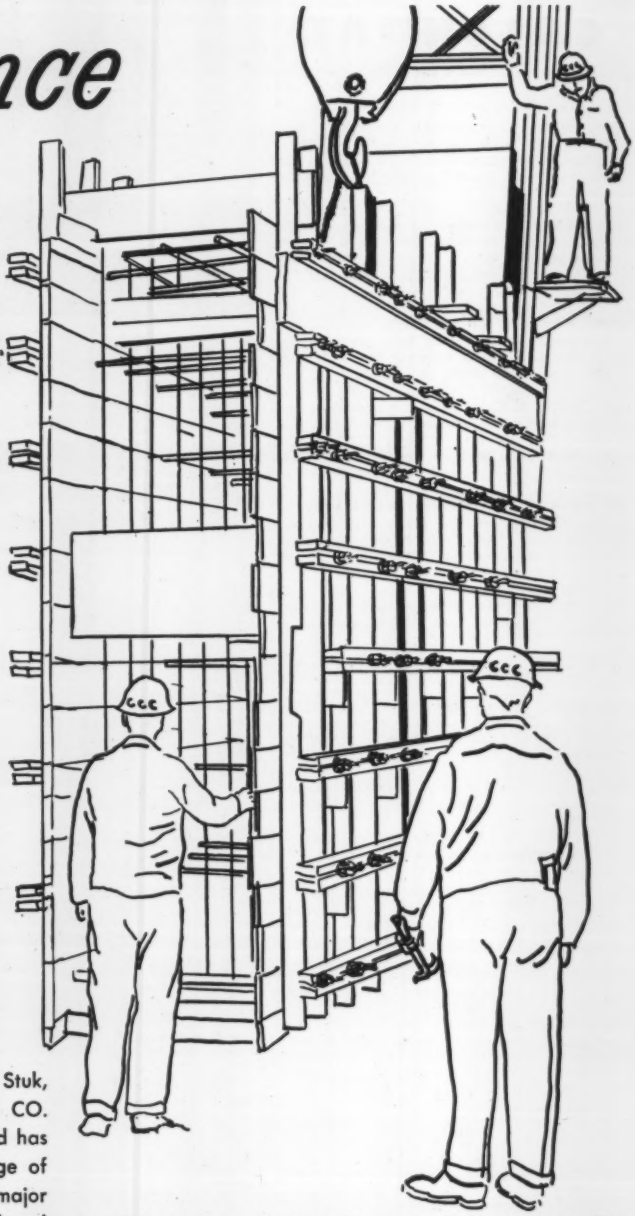
JOSEPH STUK
GENERAL CARPENTER SUP'T.



Take for an instance the case of Joseph "Joe" Stuk, general carpenter supt. for CHICAGO CONCRETE CO. Joe, who has carried a carpenter's card since '28 and has been in a supervisory capacity 18 years, is in charge of prefabricated form work and scaffolding on all major projects wherein particular emphasis has to be placed on exactness and an understanding of what is called for and how best to accomplish that end.

His pet assignment is, working exclusively from prints, to supervise the building of forms and scaffolds by sections away from the construction site while other CHICAGO CONCRETE crews are at work preparing for new construction. Within minutes after the other crews are finished, Joe and his crew are fitting their pre-fab sections snugly and accurately in position. Savings in time affected through the efforts of Joe Stuk and his pre-fab crew literally run into days — even weeks!

While Joe Stuk is to be commended for his ability and technical ingenuity, it is to be noted that he is typical of the many skilled construction-men who make up the roster at CHICAGO CONCRETE . . . men anxious to tackle the next job that you have that calls for experience, know-how and the desire to get the job done right!

CHICAGO CONCRETE CONSTRUCTION CO.

DIVISION OF CHICAGO CONCRETE BREAKING CO.

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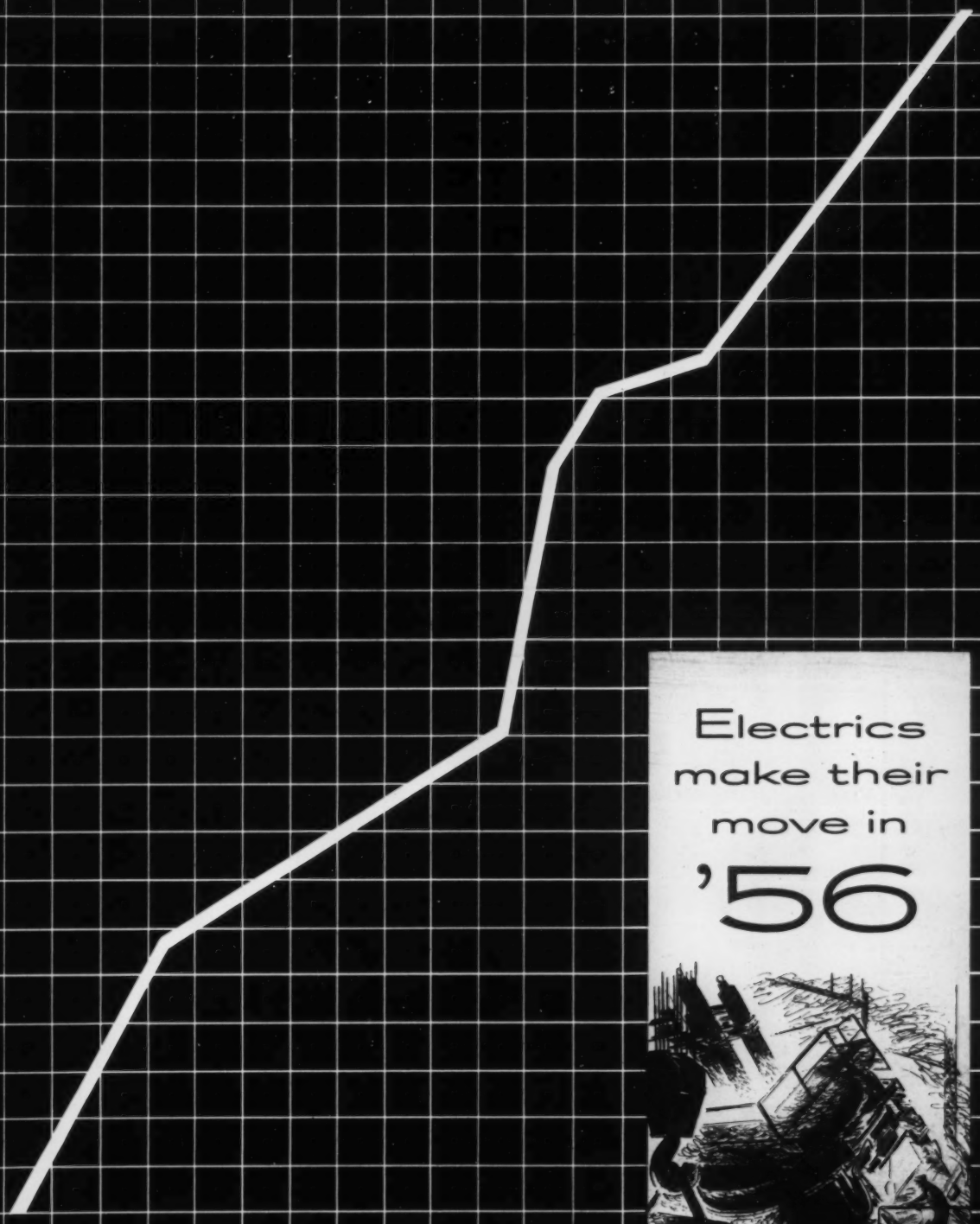
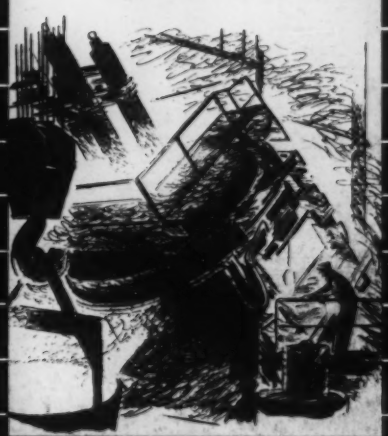
APRIL, 1957 Vol. 4 No. 1

NATIONAL CARBON COMPANY'S

CARBON AND GRAPHITE NEWS



Electrics make their move in '56



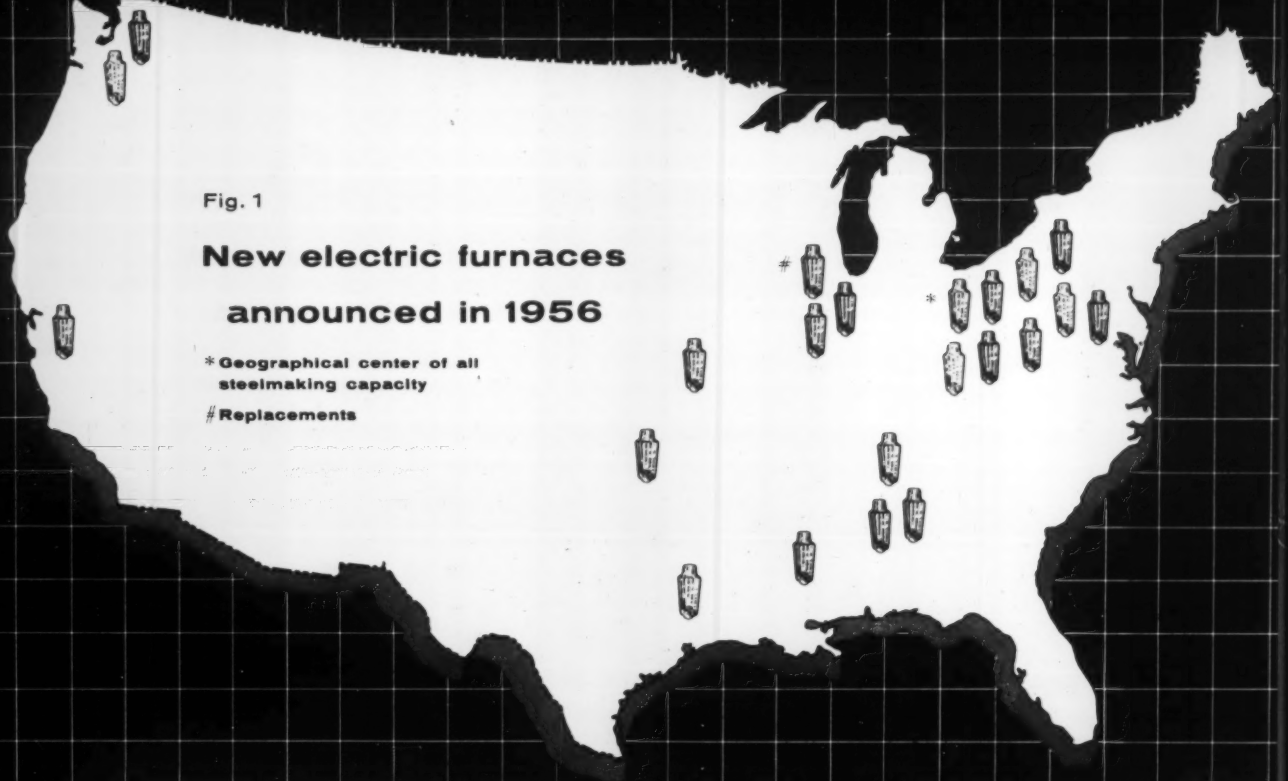


Fig. 1

New electric furnaces announced in 1956

* Geographical center of all steelmaking capacity

\# Replacements

Fig. 2

267 electric furnaces in operation at end of 1956

Electrics make their move in '56

Plans for the installation of a record 19 new electric furnaces — with a total capacity of more than 2.5 million tons — were announced by steelmakers during 1956. In addition, replacement of existing furnaces with larger units will add another 372,000 tons, boosting the new electric furnace capacity disclosed during the year over the 2.8 million ton mark. At the end of 1956, there were 267 electric furnaces in operation, with a record installed capacity of 11,501,700 tons. This new high, together with unprecedented expansion plans, made 1956 a really big year for electrics.

Geographic scattering of these new units, which represent more than 25 percent of new steelmaking capacity, is illustrated in *Fig. 1*. The fact that a majority of the new electric furnaces are to be in locations remote from the geographic center of the country's steelmaking capacity speaks well for the inherent characteristics of the electric furnace that make it possible to take advantage of local scrap, power, and market conditions in planning new facilities. *Fig. 2* shows the distribution of the 267 electric furnaces in operation at the end of 1956.

This tremendous surge in electric furnace activity is characteristic of the fabulous growth of this versatile steelmaking tool since the first heat was poured just over 50 years ago. By 1915, total electric furnace steel approximated 80,000 tons, which could be produced today in just one medium-sized furnace. From 1935 to 1955 electric furnace capacity increased 925 percent, as contrasted to a comparable growth of 61 percent for the open hearth.

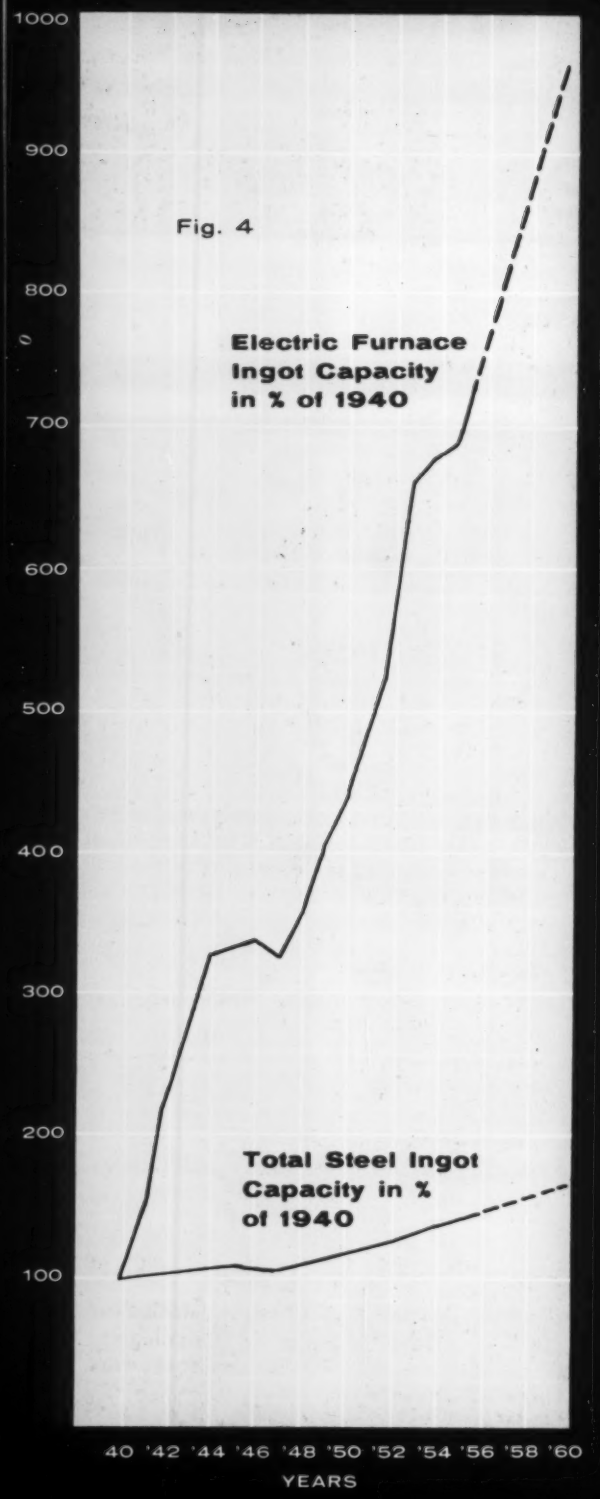
Plain Carbon Steel Sets Pace

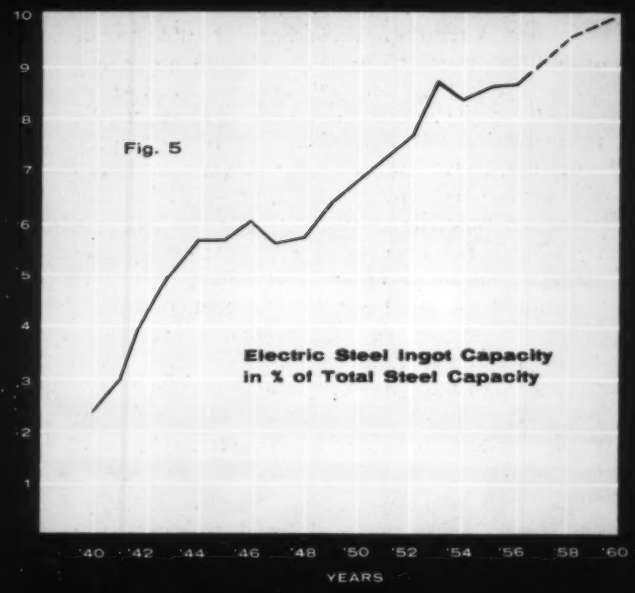
By 1940, electric furnace steel capacity had risen to 1,500,000 tons per year, or about 2.3 percent of total steel capacity. Most of these electrics were confined to the production of alloy steels. Following World War II, the industry was faced with the problem of utilizing electric furnace capacity that had been producing armor plate and other specialty steels required for the war effort. It was at this time that serious consideration was first given to the electric furnace as a producer of plain carbon steel. As shown in *Fig. 3*, the curve of the percentage of carbon steel ingots made in the electric furnace took a sharp swing upward, and has been rising ever since. By 1947, electric furnace production of plain carbon steel caught up with and passed electric furnace alloy steel production. Each year since then the greatest gains have been in plain carbon steel. Some industry observers estimate that by 1975 approximately 30 percent of total carbon steel ingots will be produced by electrics.

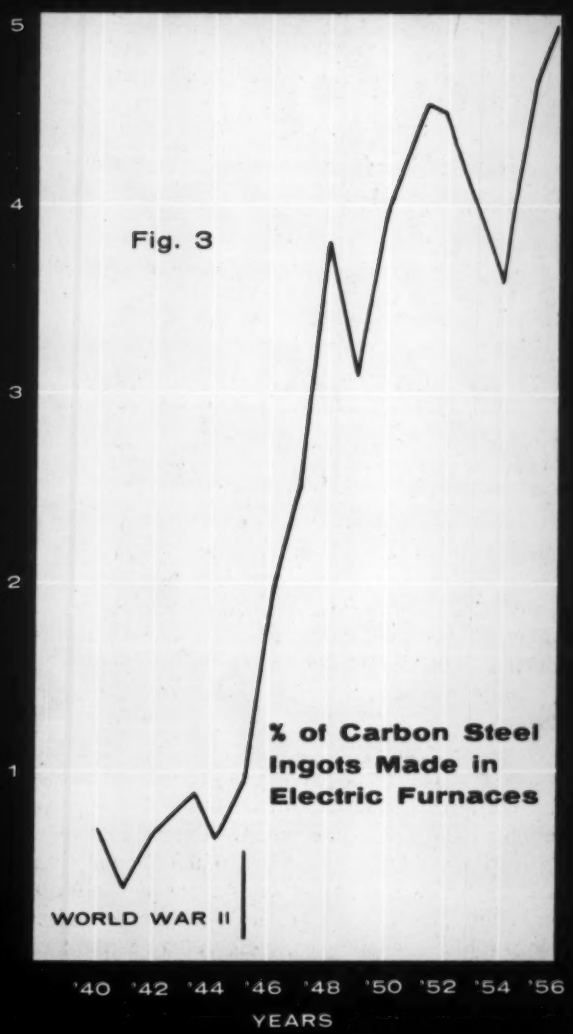
As the electric furnace is becoming an increasingly important factor in the production of plain carbon steel, and continues to play a leading role in the production of alloy and stainless steels, it naturally follows that electrics are assuming a more predominant position in the steelmaking industry as a whole. The curves of *Fig. 4* compare electric furnace ingot capacity and total steel ingot capacity in terms of 1940 levels, and illustrate the much more rapid growth of electrics as compared to the total capacity. Although the industry as a whole has followed the characteristic growth curve, electric furnace capacity has obviously passed through both a development and surge phase, and is now evidencing the characteristics of normal, healthy growth. The growth of electric steel capacity as a percentage of total steel capacity is shown graphically in *Fig. 5*.

Technology Fosters Expansion

Along with the increase in the size of the electric furnace industry have come logical technological developments that have played an important part in making this growth possible. The removable roof, higher capacity transformers, and improved regulation systems have been important contributions that have made possible larger and larger units. The original hand-charged three-ton electric furnace has grown into today's top-charged 200-ton giant, with even larger units contemplated. It is likely, some experts predict, that the larger furnaces of the future might well utilize six electrodes in an elliptical shell. Because of the electric furnace's flexibility, in shops where demand charges on electric power are a major consideration, a mixture of large and medium units can be used in order


1000
900
800
700
600
500
400
300
200
100
Fig. 4
Electric Furnace Ingot Capacity in % of 1940
Total Steel Ingot Capacity in % of 1940
40 '42 '44 '46 '48 '50 '52 '54 '56 '58 '60
YEARS


10
9
8
7
6
5
4
3
2
1
Fig. 5
Electric Steel Ingot Capacity in % of Total Steel Capacity
'40 '42 '44 '46 '48 '50 '52 '54 '56 '58 '60
YEARS


5
4
3
2
1
Fig. 3
% of Carbon Steel Ingots Made in Electric Furnaces
WORLD WAR II
'40 '42 '44 '46 '48 '50 '52 '54 '56
YEARS

to maintain a high load factor.

Improved regulation has made possible the use of higher powered furnaces, permitting quick melting of the light scrap that has been used almost exclusively in electrics since the end of World War II. The greater energy-absorbing area of lighter scrap allows the use of higher power, and removable roofs permit quick charging, so the developments go together in increasing the efficiency of the electric furnace to the point that plain carbon steel production is competitive with open hearths.

In addition to supplementing open hearths in fully integrated mills as desirable consumers of revert scrap, electric furnaces are almost universally accepted to be the economic answer to non-integrated operations producing plain carbon steels. Some steelmakers have chosen to use electrics and scrap to level out periods of peak and slack production, rather than resort to the heavy capital investment in blast furnaces. Others have found the flexibility offered by electrics to be the answer to their diversification problems, and still others are thinking of duplexing with oxygen converters. No matter how the future of steelmaking is approached, the electric furnace is in the picture.

Charging Developments Affect Future

One of the few deterrents to the unlimited growth of the electric furnace in the United States is the scrap situation. During recent months, domestic scrap prices have actually exceeded the price of pig iron, and consequently increasing attention is being given to hot metal charging of electric furnaces. The desiliconization of hot metal and the production of electric furnace pig iron are developments to be closely watched. A number of means for the direct hydrogen reduction of ore have been developed and publicized, and are not to be discounted.

The evolution of a good hot-metal practice for the electric furnace, and the development of a source of directly-reduced iron (other than blast furnace iron) for charging will open up an almost unlimited future for electric steel. With fuel costs for open hearths estimated up some 25 percent by 1975 (in terms of 1956 dollars) and electric power costs being reduced by increasing the efficiency of generation, the favorable open hearth economics of recent years will disappear. It is significant that electric furnace melting has been employed by the six most recent entrants into the steelmaking industry.

Perhaps every year can't be the big year 1956 was, but authorities visualize a growth in the electric furnace production of carbon steel of approximately 1,000,000 tons a year for the next 20 years, with alloys adding another 6,000,000 tons total. Although new steel-producing processes will also find their places, the electric furnace's flexibility, geographic independence, temperature control, deoxidation ability, start-up and shut-down ease, minimum space and labor requirements, and relatively low capital investment indicate many more "big years" ahead.

Look Ahead—
Look Electric

Gives greatest flexibility—
Makes any steel—any time—from stainless to plain carbon. Handles cold scrap, metallics, hot metal. Starts, stops quickly—gives faster melts.

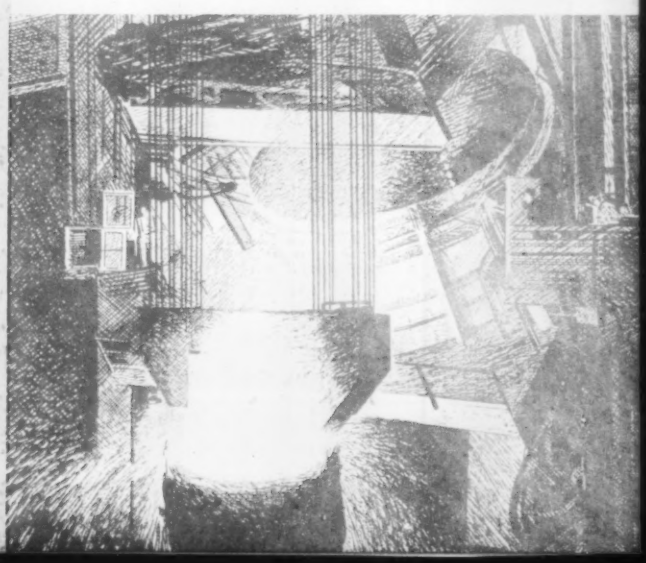
Delivers highest quality product—
Closer temperature control possible.

Lowers capital investment—
40% less than equivalent open-hearth capacity.

Saves space—
Savings of 25% and more vs. open hearths producing same tonnage.

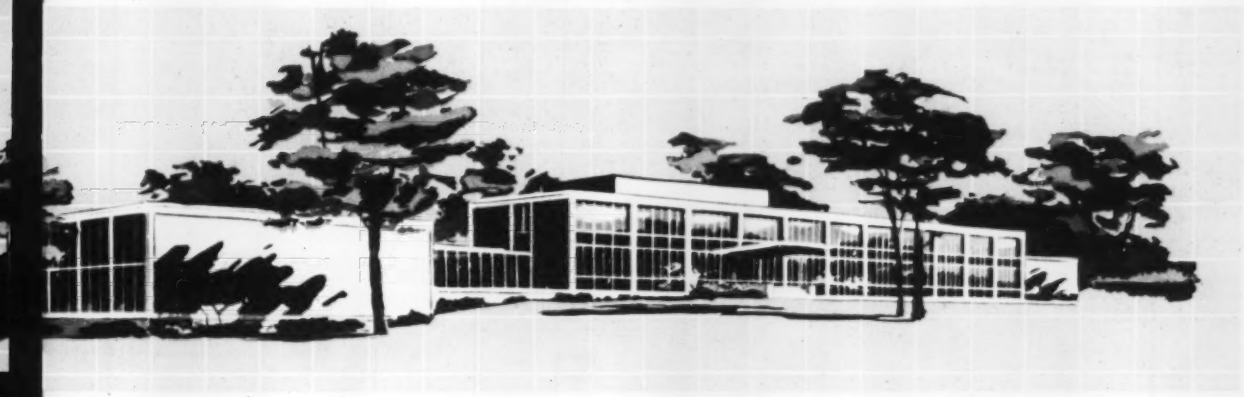
Goes up fast—
Capital investment pays off sooner.

Uses clean fuel—electricity—
No combustion products to contaminate melt.



Putting electrical connections on a single crystal of graphite for research studies on its electronic properties.

Working at the outer boundaries of knowledge



RESEARCH AT NATIONAL CARBON'S NEW LABORATORIES, PARMA, OHIO

Albert Einstein once expressed the opinion that the trouble with theoretical physics was its frequent inability to provide quick solutions to urgent practical problems. Long recognizing the validity of this observation, National Carbon Company shuttles its immediate practical problems to its Product Development Laboratories; turns over theoretical and basic research to the highly specialized teams of scientists at its newly dedicated Research Laboratories at Parma, Ohio.

At this ultra-modern, multi-million dollar facility, research combat teams attack fundamental problems in four highly complex, strategic areas — carbon and graphite basic research, high temperature processes, solid state physics (and closely related chemical physics) and electrochemistry. These teams seek the basic concepts from which the answers can subsequently be fashioned to many practical questions on electric furnace electrodes, refractories, nuclear power plants and nuclear armament, high temperature lubricants, electro-winning of metals, the electrochemistry of new battery systems and many other areas of prime importance to industry.

Basic Carbon and Graphite Research

Carbon and graphite electrodes, carbon brick, carbon blast furnace and cupola linings, carbon brushes for motors and generators are all vital tools of the trade well known to the steel industry. To seek new and better forms of carbon for these and countless other existent and future applications is Parma's mission today. The task is formidable when one considers the roadblocks to research thrown up by the peculiarities of the element carbon itself. The traditional techniques for working with such materials as iron and steel or copper and brass are not applicable to carbon for here is a substance which can neither be melted nor cast in molds as can most metals and plastics.

It is not found in nature in usable sizes or shapes, so products of carbon must be manufactured — a process which involves making a suitable mix of finely ground particles and binding agent, molding or extruding the resultant mixture to desired size and shape and then carefully heat treating under precisely controlled conditions for unusually long time cycles.

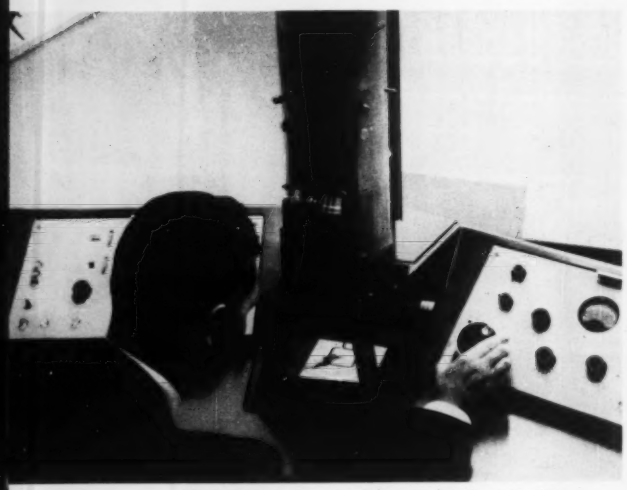
Single Crystals Yield Their Secrets

All carbon and graphite materials basically consist of clusters of many, many small graphite crystals. The great variation in electrical and thermal behavior between what appear to the eye to be similar carbon specimens is explained by the variations in sizes and physical relationships between the tiny graphite crystals within these several carbon specimens.

It is such variations which account for the wide range of thermal conductivities exhibited by various specimens of graphite. One lot can be manufactured with a thermal conductivity five times greater than copper's; another lot with an insulation value greater than that of ordinary building brick — a conductivity range factor of more than 1000 to 1!

In order better to study carbon's properties and, more importantly, to enable the tailor-making of a particular carbon with a predictable set of properties for a specified application, it is necessary to isolate and investigate single graphite crystals. Until recently, this has proven a most

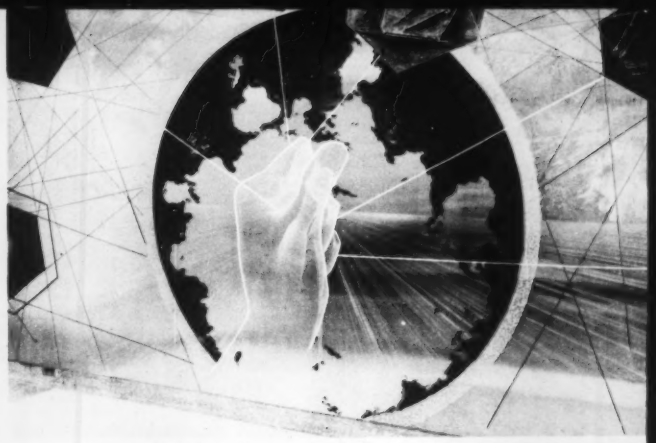
frustrating area to explore because impurities in the crystals defied eradication and thus distorted experimental data. But now National Carbon scientists have perfected new techniques for purification which remove chemical contaminants from the crystals and, at the same time, banish imperfections and weaknesses from the crystalline structure itself. Result: fused graphite crystals approaching the ideal for purity and structural perfection — a "break-through" of major significance along the roadway leading to fundamental quantitative data on graphite's behavior.



Electron microscope probes carbon's mysteries.

High Temperature Refractories

Another significant field of inquiry having great potential importance for industry is the Parma Laboratories' investigation of high temperature phenomena with emphasis on the synthesis of a new, broad class of super-hard materials to perform satisfactorily at temperatures over 4,000°F! Typical is titanium diboride, the hardest man-made material having no counterpart in nature. Successfully made at Parma by company-developed fusing methods, titanium diboride slices through fine knife steel easily, is suitable for cutting stainless, holds much promise for rocket motor nozzles and turbine blades. And there is titanium carbide, extremely hard and corrosion resistant. And cerium monosulphide destined for a major role in producing zirconium and titanium, metals vital to nuclear power plants and jet engines. These are but a few of the high temperature materials of tomorrow being perfected as a result of basic research in National Carbon Laboratories today.



Symbol of Modern Research—Emblazoned in Epoxy Resins and Stainless Steel . . . The Story of Man's Endless Groping for Knowledge. (From Impressive New Mural Executed by Buell Mullin for National Carbon Research Laboratories)

Beyond The Outer Boundaries Of Knowledge

Where does this elaborate, far-flung program lead? Perhaps the most revealing tip-off comes from observing the scientists involved, watching their restless zeal as they pursue the answers to questions which, until recent years, could not even have been asked. It soon becomes apparent that this huge research endeavor, despite its complexities, is directed toward a clearly perceivable goal — the extension of the frontiers of pure science, breaking through the outer boundaries of today's knowledge.

If you would like to know more about the important work being done at Parma, send for our free booklet "Research"—Just address: Advertising Department, National Carbon Company, 30 East 42nd Street, New York City 17, New York

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A Multipress case study

MULTIPRESS® ends rejects of plastic toy assemblies for Lionel

ASSEMBLING plastic and powdered metal toys with mechanical presses resulted in excessive scrap losses at Lionel Corporation. Then Multipress tackled the job, and rejects were a forgotten profit-taker.

With Denison's hydraulic Multipress, the ram stroke adapts itself automatically to variations in material thickness, delivers only the exact pressures required. No more loose assemblies because of inadequate ram pressure; no more fractured parts caused by excessive pressure.

Lionel also found that workers prefer the quiet, safe hydraulic operation of the Multipress . . . and lost time in tooling changes and maintenance has been cut to a minimum.

Let a Multipress expert show you how to improve your production methods . . . cut costs. Write Denison Engineering Division, American Brake Shoe Co., 1180 Dublin Road, Columbus 16, Ohio.

Rejects have been cut to a minimum by using Multipress for staking these miniature assemblies at Lionel Corp.

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Here are vital steps that will give you exactly the results you're looking for on deburring, descaling and finishing your products.

One is to switch from out-of-date tumbling or off-hand methods.

The other is to check Norton Tumblex materials and learn which, together with modern barrel finishing techniques, make the best combination to meet your particular requirements.

The long, expert experience of Norton engineers in developing Tumblex abrasives has brought the value-adding, cost-cutting "Touch of Gold" to barrel finishing of the widest range of products. To you, this means prompt aid in solving finishing problems. Just send sample parts, ranging from tiny needles to hefty forgings, to the Norton Sample Processing Department. You'll get helpful recommendations as to the type and size of Tumblex material to use — plus other data on the tumbling barrel equipment and operating methods you need most. **Or write, to Norton Company, Worcester 6, Mass.** for a copy of the newly revised handbook on barrel finishing. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-323

ALUNDUM* Tumblex "S". Newly developed bonded spheres that easily get into areas where other abrasive shapes can't reach. Exceptionally dense and long lasting, for top barrel finishing in many applications. In five different sizes.

ALUNDUM Tumblex "T". Bonded, triangular shape, and fast cutting for special shaped parts. Triangular form prevents wedging in work slots or holes. Available in four sizes.

ALUNDUM Tumblex "A". The workhorse for general barrel finishing. Performs several operations at once, removing flash, scale, tool marks and burrs, while forming radii and finishes to required microinch. Made in eleven sizes.

Tumblex "N". Natural stones, offered exclusively by Norton, for high lustre, especially on die castings and soft metal. Rounded uniform shape brings out the most desirable color of finished parts. In seven sizes.

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ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels Grinding Machines • Refractories
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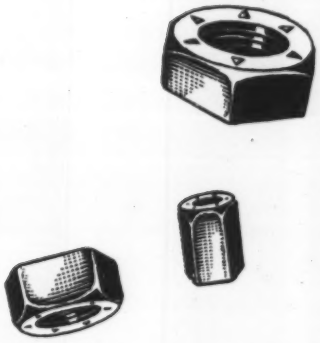
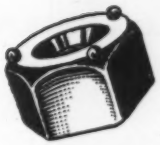


For over 50 years, leading manufacturers in all the major industries have used Gripco lock nuts to simplify production, lower manufacturing and maintenance costs and to improve the durability of all kinds of assembled products. To maintain this enviable reputation for outstanding product quality, the Grip Nut Company of South Whitley, Indiana, uses quality-controlled Youngstown Scrapless Nut Wire and Bars as basic raw material.

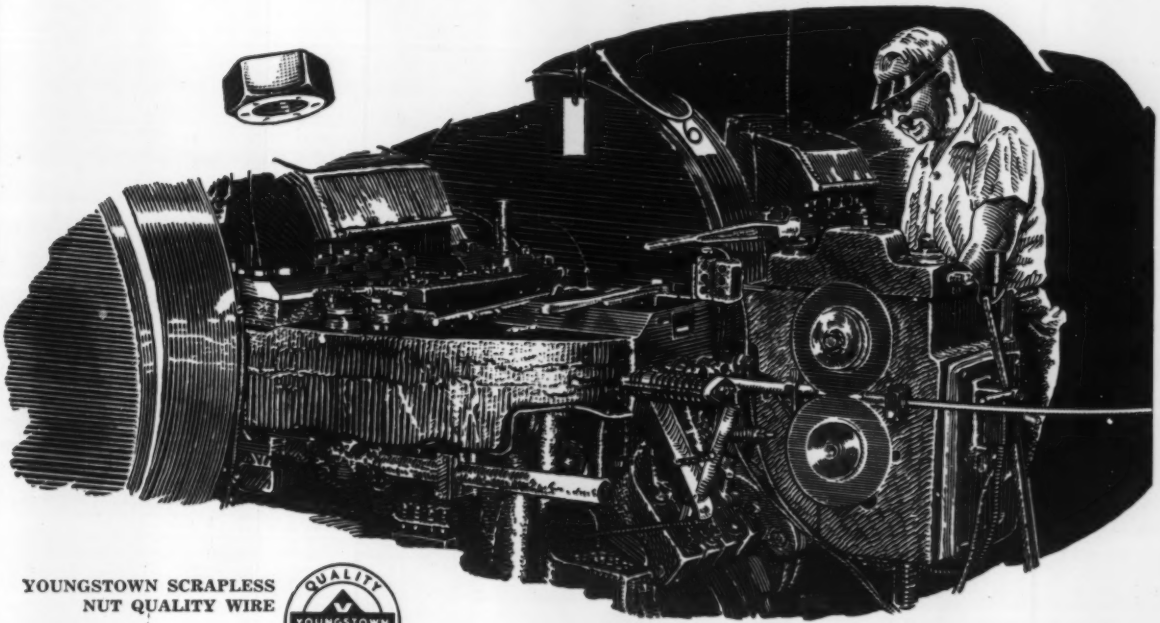
Because it comes to your plant free from all piping, injurious seams, laps, die marks, internal tearing and cupping, and non-metallic inclusions —Youngstown Scrapless Nut Quality Wire will provide increased production with fewer rejects which adds up to a healthy over-all profit boost. Also, its smooth coating extends die life thus minimizing costly die replacements.

YOUNGSTOWN SCRAPLESS NUT WIRE

Helps Maintain Quality of GRIP *Lock Nuts*



Youngstown Scrapless Nut Quality Wire is provided in special resulphurized steels as well as in standard AISI grades. Cold Heading Bolt Wire, of the same high Youngstown quality, is also available in all standard carbon and alloy analyses. Why not phone or write to our nearest District Sales Office for additional information or metallurgical assistance?



YOUNGSTOWN SCRAPLESS NUT QUALITY WIRE

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

A "useful life" is not

for production men

This Avey machine drills various patterns of holes in jet engine parts by changing program drums or by alternating two automatically-driven shot bolts which locate the table accurately from a radial position. Program drum also programs one or more of the four drilling units for drilling, reaming, and similar operations.

The machine consists entirely of standard Avey units: four Aveydraulic automatic units with 12″ feed; cast iron columns; 120″ fan type steel base; 60″ Electrodex table. Top column and unit have an in-and-out traverse of 20″. The ways are mounted on steel adaptor blocks which can be removed for different heights.

All units and the index table are push button-controlled.

If you're looking for flexibility in a special machine, your Avey man's the man to see.

for management

Many machine tool buyers were caught between the tax authorities' "useful life" of 20-25 years and their machines' profitable life of 6-7 years. If you were caught in this dilemma, you recovered only a fraction of a machine's cost through depreciation by the time it should have been replaced; so you couldn't build up any replacement reserve.

Now you have a collection of antiques which lose nearly as much money in production as they do when they're down. Furthermore, they lack the productive capacity to keep pace with your currently expanding markets.

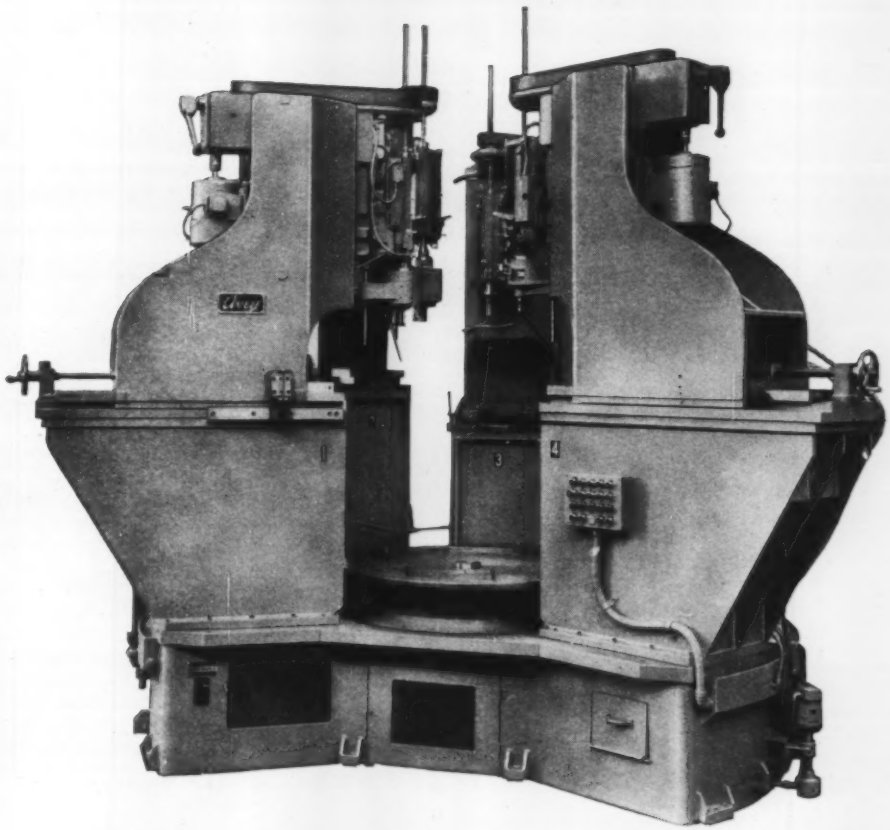
Avey has a combination to get you out of this dilemma: first, a pay-as-you-produce plan which solves your ready cash problem; but more important, production machines with such a fast rate of return on your investment that you'll be making clear profit in two years or less.

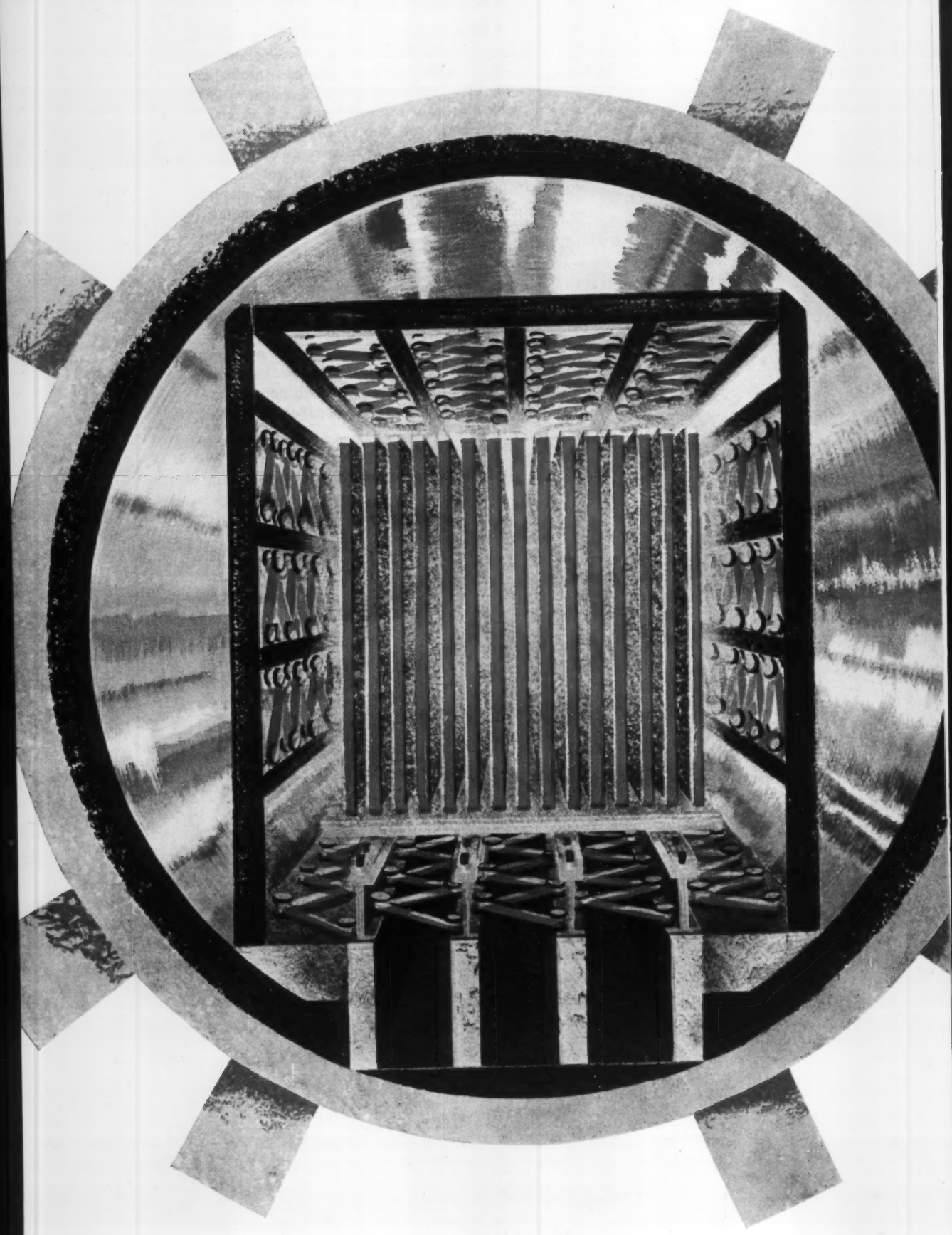
THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

a happy one

Avey



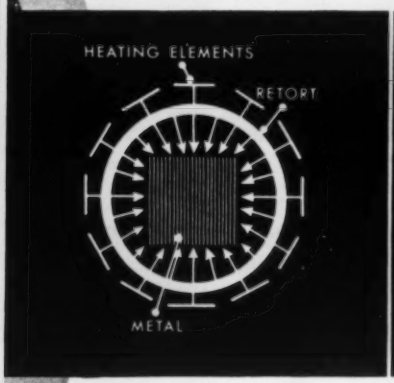


New Westinghouse Kold-Retort furnace speeds vacuum heat-treating of titanium... eliminates retort problems

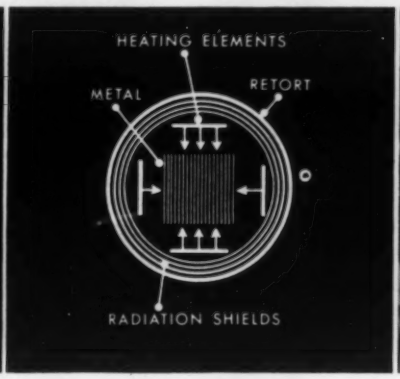
Kold-Retort® furnace design is a bold, original step to increase heating and cooling rates and lower production costs in processing reactive alloys.

It started with setting aside conventional furnace concepts. By co-ordinating vacuum equipment research with design and operating experience at Mallory-Sharon Titanium Corp., Westinghouse engineered more effective heat application.

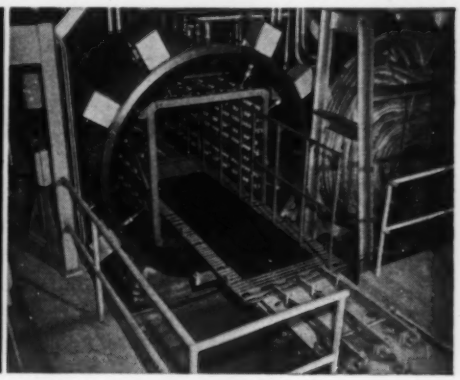
Conventional vacuum furnaces (A-below) depend upon radiation of heat to the retort which then radiates it to the charge. Kold-Retort design (B) places the heating elements inside the retort and uses radiation shields for insulation. Hence, there are no replacement costs for retorts distorted by frequent heating cycles.



A-*Conventional furnace design*



B-*Kold-Retort furnace design*



C-*Kold-Retort furnace in operation at Mallory-Sharon Titanium Corp., Niles, O.*

Kold-Retort furnaces (C) have been built with charge capacities up to 4 x 4 x 12′ long and for temperatures up to 3200°F. Because the retort remains cold, there are no size limitations. Preliminary work has already been done on a unit 20 x 12 x 50′ long for brazing complete aircraft wings at 2150°F.

This new Westinghouse design can be a practical answer to lower your costs in vacuum annealing and degassing of titanium and zirconium alloys, bright annealing of stainless steels, and in high-temperature brazing of intricate structures. It's another example of the way Westinghouse helps you Power-Up . . . to get better production and profit from your electrical dollar. Write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa.

J-10467

YOU CAN BE SURE... IF IT'S Westinghouse

Flat Blanks to Finished Cylinders...

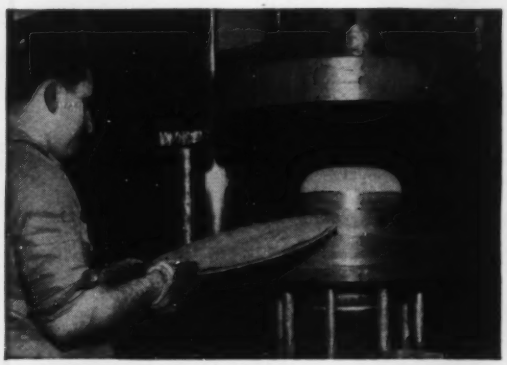
Higher Production Better Quality

one of the nation's foremost producers of cylinders for compressed gases —NORRIS-THERMADOR CORP.— uses Parker's aids to cold forming

The Bonderite and Bonderlube combination provides effective lubrication and acts as a non-metallic parting layer between work and dies. More severe deformations are possible, reducing the number of press operations and process anneals necessary. Die life is lengthened and surface finish improved.

Bonderite and Bonderlube, by more efficient lubrication, help plants reach new production levels, get more efficient and economical production, and achieve better, more uniform quality.

Parker's cold forming experience in many plants and on many products is available to apply on your cold forming problems at once. Write or call today.



Cupping: Flat CO_2 cylinder blank, treated with Bonderite and Bonderlube, is changed into cylindrical form, with maximum of about 45% reduction in diameter of blank.

First reduction: Diameter of cup is made smaller and length increased without major change in wall thickness.

Second reduction: Final diameter of part with respect to length determines number of reductions required. Photos courtesy NORRIS-THERMADOR Corporation, Los Angeles, California.

FREE TECHNICAL BULLETIN MAILED ON REQUEST

Illustrated technical bulletin "Bonderite and Bonderlube As Aids In Cold Forming" contains detailed information. Mailed free on letterhead request.

Since 1914— leader in the field

PARKER RUST PROOF COMPANY

2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite, Parker Pre-Namel—Reg. U.S. Pat. Off.*

If you're in a hole . . .

BECAUSE OF GRINDING WHEEL PROBLEMS, there's an easy way to get back on top of the situation. Switch to CINCINNATI (PD)° WHEELS. *Now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and* increase your production.

It doesn't take any digging to find out *why* everybody's talking about (PD) WHEELS. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

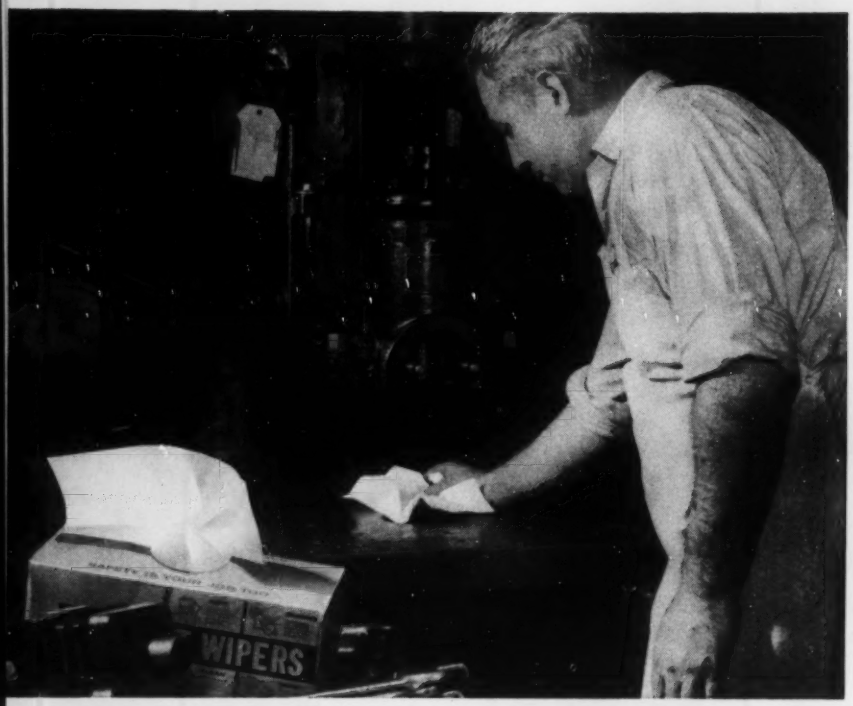
°Trade Mark Reg. U.S. Pat. Off.

So, if you want back on solid ground again, see your CINCINNATI Grinding Wheels Distributor. He'll be glad to explain how (PD) WHEELS can save you money and increase production. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you (PD) POSITIVE DUPLICATION.

CINCINNATI° *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



The use of Scott Wipers at the plant of the Voicewriter Division, Thomas A. Edison, Inc., at West Orange, N.J., ranges from machining operations, where oil absorbency is required, to assembly of delicate parts, where softness and freedom from lint are essential.

WIPER PROBLEM? Look what Edison did with Scott Wipers!

The changeover from wiping rags to Scott Wipers at the Thomas A. Edison plant eliminated a number of problems and improved production of Voicewriter dictating machines.

Lint from rags was a problem in the wiping of delicate parts—lint-free Scott Wipers solved this. Scratching of lucite parts was a problem—until eliminated by wiping and *wrapping* with Scott Wipers. And Scott Wipers have proved so versatile that they are now used for wiping jobs throughout the plant—in punching, plating, drilling and other operations.

Management no longer needs different wipers for different departments. Wiper inventory is simpler, wiper costs lower, laundering expense and trouble eliminated.

Scott Wipers are 2-ply paper, chemically treated for wet strength and "perf-embossed." This exclusive process* makes them soft and highly absorbent. Want more details? Call the local Scott representative or distributor. Or write Scott Paper Company, Dept. S-74, Chester, Pa.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult your local TV schedules for Scott's program, "Father Knows Best."

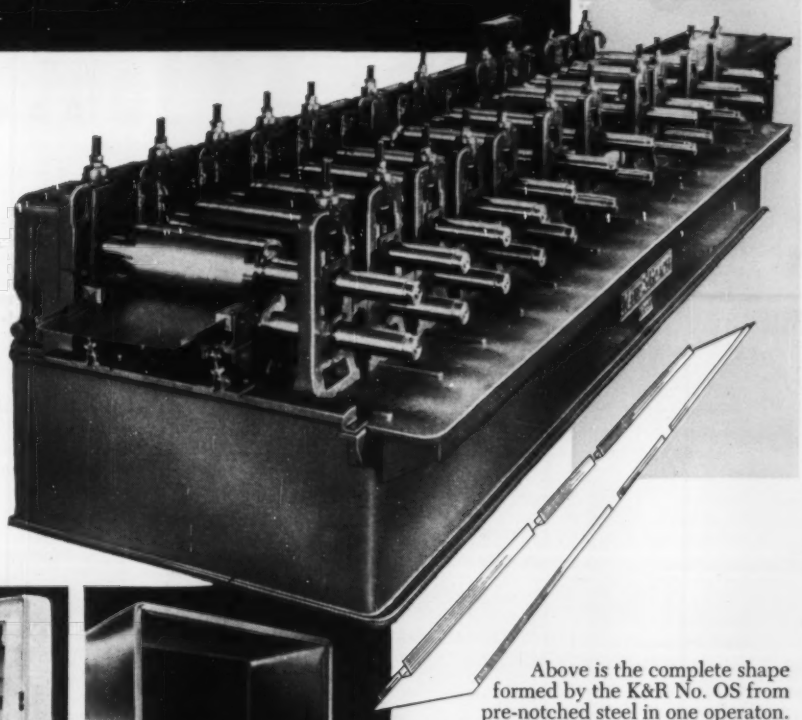
*Patent pending

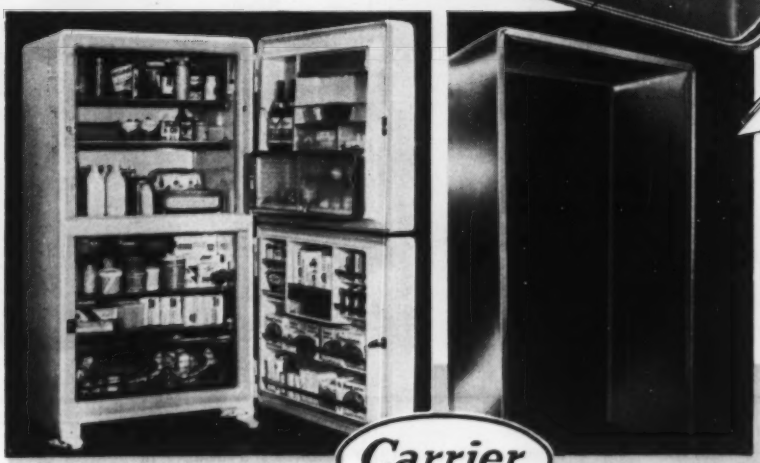
13 Seconds DOES IT!

No. OS COLD ROLL FORMING MACHINE

This machine, furnished to Carrier Corporation, roll forms the outer shell of a freezer unit in 13 seconds from 20 gauge cold rolled steel, pre-notched sheets.

Typical of similar K&R installations, this machine gives excellent performance, and maintains close tolerances.





Above is the complete shape formed by the K&R No. OS from pre-notched steel in one operaton. Other sections can be formed with additional tooling.

At left is the finished outer shell.

At extreme left, finished product marketed by Carrier. Engineers of the company are well satisfied with the accurate, fast performance of the K&R OS.

Carrier

KANE & ROACH No. OS COLD ROLL FORMING MACHINE MEETS Carrier PRODUCTION SCHEDULE

For fast, quality production and consistent cost reduction, always specify K&R. Far superior to press brake methods for producing forms even from pre-notched steel sheets . . . more accurate and faster, too.

K&R

Kane AND ROACH, INC.

SYRACUSE, NEW YORK • ESTABLISHED 1887

METAL WORKING MACHINERY SINCE 1887

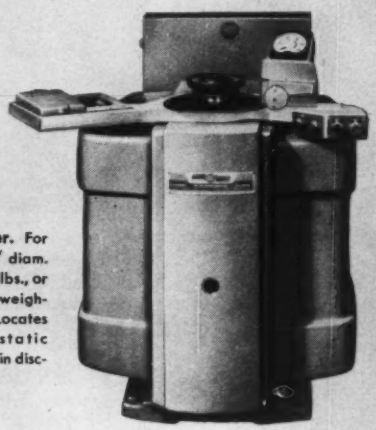
Cold Roll Forming Machines

Bending Rolls — Straightening Rolls

Slitting Lines — Flying Shears and Saws

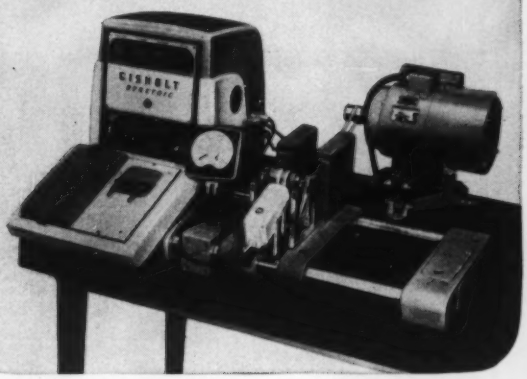
Special Metalworking Equipment

GISHOLT takes the ...cuts time

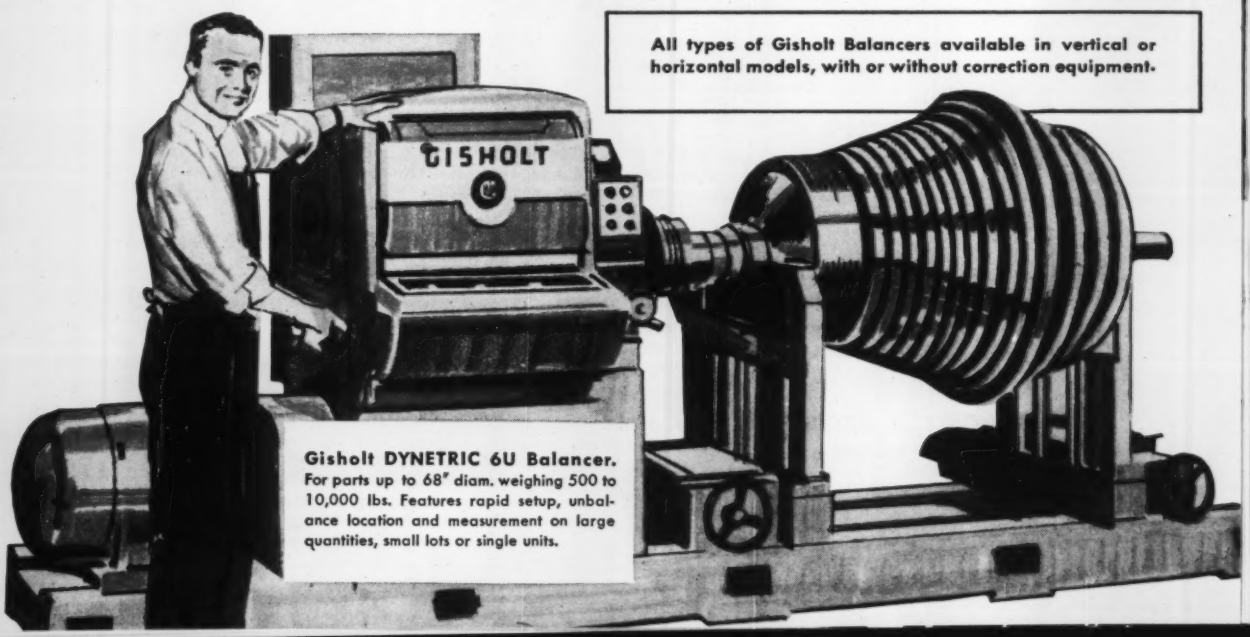


Gisholt 1SV1 Balancer. For parts up to 11½" diam. weighing 1 to 15 lbs., or up to 17½" diam. weighing 2 to 50 lbs. Locates and measures static (force) unbalance in disc-like parts.

Gisholt OSB Bench Balancer. For parts up to 6" diam. weighing 0.25 to 5 lbs. Small parts readily handled, with location and amount of unbalance in each of two selected planes accurately determined in 15 seconds or less.



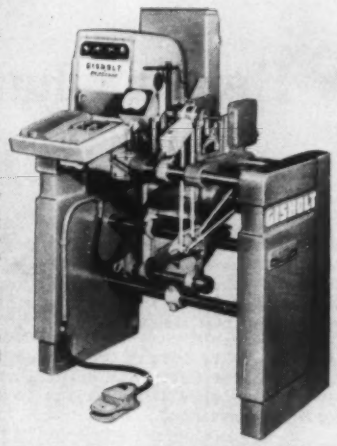
All types of Gisholt Balancers available in vertical or horizontal models, with or without correction equipment.



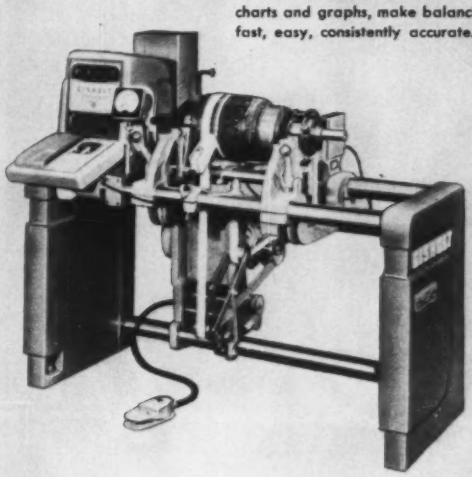
Gisholt DYNETRIC 6U Balancer. For parts up to 68" diam. weighing 500 to 10,000 lbs. Features rapid setup, unbalance location and measurement on large quantities, small lots or single units.

guesswork out of balancing and costs, too!

MASTERLINE
GISHOLT
SINCE
1887



Gisholt 1S Balancer. For parts up to 12" diam. weighing 1 to 30 lbs. Locates and measures either force or moment unbalance effects, indicating amount of correction in units most practical for part.



Gisholt 3S Balancer. For parts up to 24" diam. weighing 15 to 300 lbs. Gisholt Balancers eliminate charts and graphs, make balancing fast, easy, consistently accurate.

IN A MATTER OF SECONDS, a Gisholt Balancer locates and measures vibratory movements in either one or two planes (force or moment), and tells your operator precisely where and how much correction to make to balance the part.

By simply reading the Amount Meter, he knows instantly how much solder or how many washers to add, or how deep to drill, etc. There is no computation, no charts or graphs because Gisholt Balancers tell the story directly—and they tell it in terms of the actual correction method employed.

How is it done? Through electrical networks, providing the necessary amplification for precise readings... and eliminating guesswork by separating and isolating unbalance effects, for maximum accuracy and ease of correction on all types of work.

What will Gisholt Balancing mean in your own operations? Just this: you'll balance more parts per hour—to highest possible standards at lowest possible costs.

Whether you plan to balance parts weighing only a few ounces to 150 tons...your Gisholt Representative can show you the better way of doing it with Gisholt Balancers. Call him today!

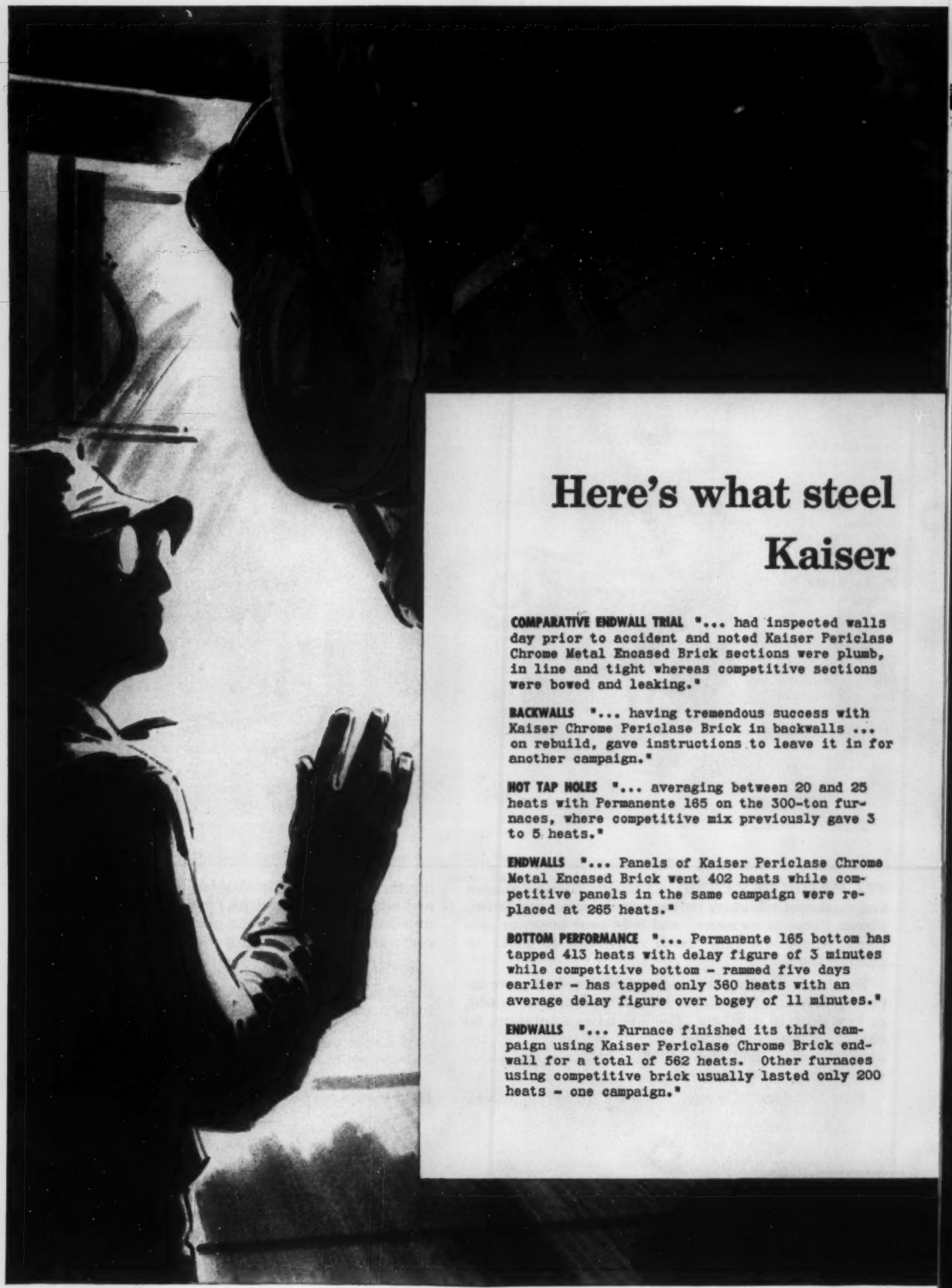
DYNETRIC BALANCERS

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

WRITE TODAY for 36-page illustrated booklet "Balancing Machines," analyzing problems of balancing rotating parts.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS



Here's what steel Kaiser

COMPARATIVE ENDWALL TRIAL "... had inspected walls day prior to accident and noted Kaiser Periclase Chrome Metal Encased Brick sections were plumb, in line and tight whereas competitive sections were bowed and leaking."

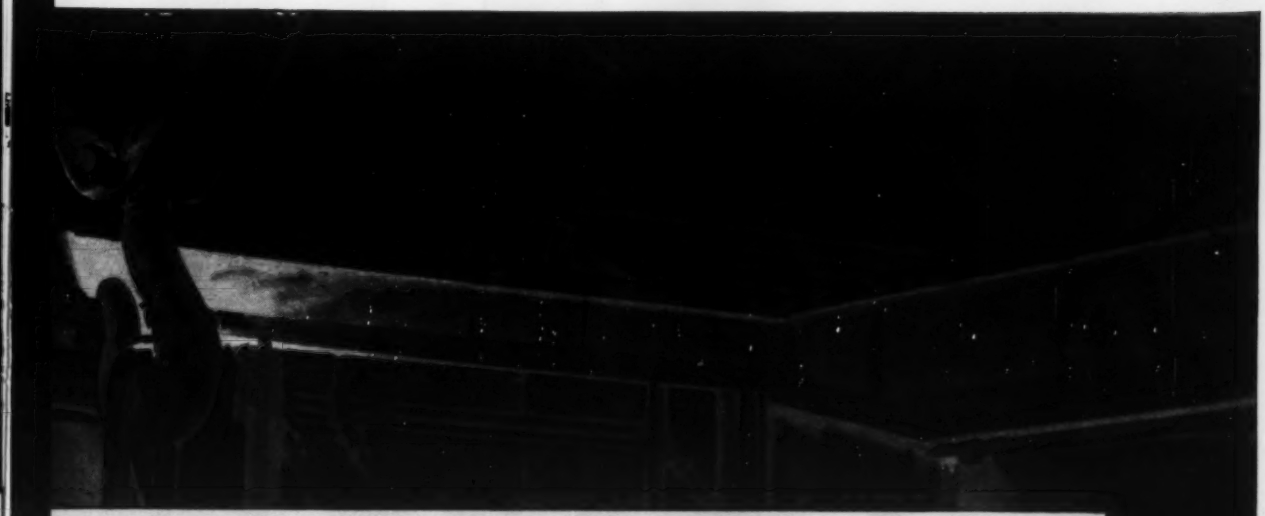
BACKWALLS "... having tremendous success with Kaiser Chrome Periclase Brick in backwalls ... on rebuild, gave instructions to leave it in for another campaign."

HOT TAP HOLES "... averaging between 20 and 25 heats with Permanente 165 on the 300-ton furnaces, where competitive mix previously gave 3 to 5 heats."

ENDWALLS "... Panels of Kaiser Periclase Chrome Metal Encased Brick went 402 heats while competitive panels in the same campaign were replaced at 265 heats."

BOTTOM PERFORMANCE "... Permanente 165 bottom has tapped 413 heats with delay figure of 3 minutes while competitive bottom - rammed five days earlier - has tapped only 360 heats with an average delay figure over bogey of 11 minutes."

ENDWALLS "... Furnace finished its third campaign using Kaiser Periclase Chrome Brick endwall for a total of 562 heats. Other furnaces using competitive brick usually lasted only 200 heats - one campaign."



industry users are saying about Basic Refractories

One of the most significant things about these statements from Kaiser Chemicals customers is that each of them illustrates a *new performance or production record* made possible by changing to a Kaiser Chemicals basic refractory product.

Why this uniform superiority?

Kaiser Chemicals refractories are *especially designed* for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition . . . each is backed by more than 15 years of continuous research and development.

The uniform composition of Kaiser Chemicals refractories—your guarantee of dependability—is assured by Kaiser Chemicals fully-integrated facilities, controlling quality from initial production of sea water magnesia to assistance in final installation at your mill.

Call or write Kaiser Chemicals Division, Dept. S7242, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below.

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HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS BASIC REFRACTORIES FOR THE STEEL INDUSTRY:

Kaiser **PERICLASE** Brick (D-S)
Kaiser **PERICLASE-CHROME** Brick
Kaiser **CHROME-PERICLASE** Brick
Permanente 165 Ramming Mix
Permanente 84 Ramming Mix

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

1 it's SIGMA SPOT-WELDED

2

School-desk standard assemblies are sigma spot-welded in a turn jig at the rate of 2 a minute.

3

In this highly efficient production setup, twelve clean, sound sigma spot-welds are made per steel desk standard in less than 15 seconds . . .

versatile and fast—Sigma spot-welding machines make top quality spot, plug, and tack welds on tubes, brackets, ducts, tanks, vehicle and machinery parts—and literally hundreds of other assemblies. Blanketed by a shield of inert argon gas, each weld is clean and sound requiring little or no weld finishing.

rugged and simple—Sigma spot-welding machines are ruggedly built for multi-shift production—and they are amazingly simple to operate and maintain. Get more information about the sigma spot-welding machine designed for your specific production needs. Call your local LINDE representative today, or write for free illustrated literature on sigma spot-welding.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde Trade-Mark

California giant Sequoias—largest of all trees.

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

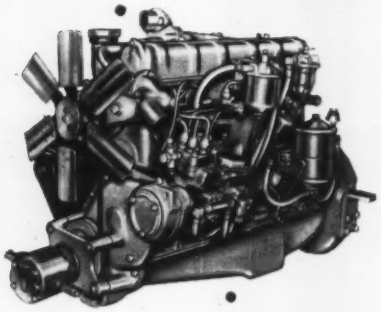
You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.

LOOK UNDER THE HOOD.....see the reason ALLIS-CHALMERS fork trucks outperform from the start



No matter how you look at it, fork truck performance starts with the engine. That's why you can expect an Allis-Chalmers fork truck to outperform *right from the start.*

Allis-Chalmers engines are real heavy-duty, industrial-type — the strongest and most rugged used in a fork truck. Every part is built to exceed maximum wear and stress expectancy, putting thousands of extra work hours into Allis-Chalmers fork trucks—keeping them on the job.

But durability is only part of the story. Compare an Allis-Chalmers fork truck in material moved per hour and you will quickly see what an engine with extra usable torque and responsive acceleration can contribute. Here is power to outproduce!

Like the entire truck, Allis-Chalmers engines are built for quick servicing, too, and are so simple to repair they can be completely overhauled *without removal from the truck.*

Since Allis-Chalmers builds its own engines, (gasoline, diesel and gas), they are interchangeable in the trucks — and you will find an amazing 85 percent parts interchangeability.

Send for literature, or ask your Allis-Chalmers material handling dealer to tell you more about this power to outperform — plus the other outstanding features of Allis-Chalmers fork trucks.

MATERIAL HANDLING DEPARTMENT, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-38

. . . especially merits your careful investigation if you are interested in superior uniformity of PHYSICALS. This wire amazes the Spring Manufacturer when he tries it on his most difficult jobs.

A trial order will convince you.

108

WASHBURN WIRE COMPANY NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

RIC ANNOUNCES
Industrial
GENERAL ELECTRIC
DIRECT CURRENT MOTOR

Direct-Current Motor

KINAMATIC* a new standard in direct-current motors, gives your machines wider speed ranges, greater output

To meet modern industrial needs for faster, more automatic, more continuous production, General Electric has designed an entirely new direct-current motor—the d-c Kinamatic.

Designed for Automation—Now, a direct-current motor has been designed for the modern job it has to do—either as individual motor drive or in regulating systems. The new General Electric d-c Kinamatic motor supplies the wide speed range and versatility required for today's manufacturing methods. It is designed for the close control of machines and split-second timing of processes essential to higher output.

Accelerated Production—The new d-c Kinamatic motor will modernize your equipment, give it increased power, higher speeds, greater output capacity. With the quick-acting G-E Kinamatic motor, your machines will process a greater variety of products . . . faster . . . easier . . . and with less maintenance and spoilage.

More Powerful—By combining advanced design with improved materials and manufacturing techniques, General Electric engineers have packed more power into the entire Kinamatic line. The powerful Kinamatic motor, with new stamina and durability, is ready to become one of your most effective weapons for keeping costs down, for meeting competition, for boosting productivity levels.

Engineering Help—Industrial specialists in 149 conveniently located General Electric Apparatus Sales Offices have the complete story on how the new d-c Kinamatic motors and generators can benefit your operation. For full details, contact your G-E Sales Representative, or write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-1

* Trade Mark of the General Electric Company

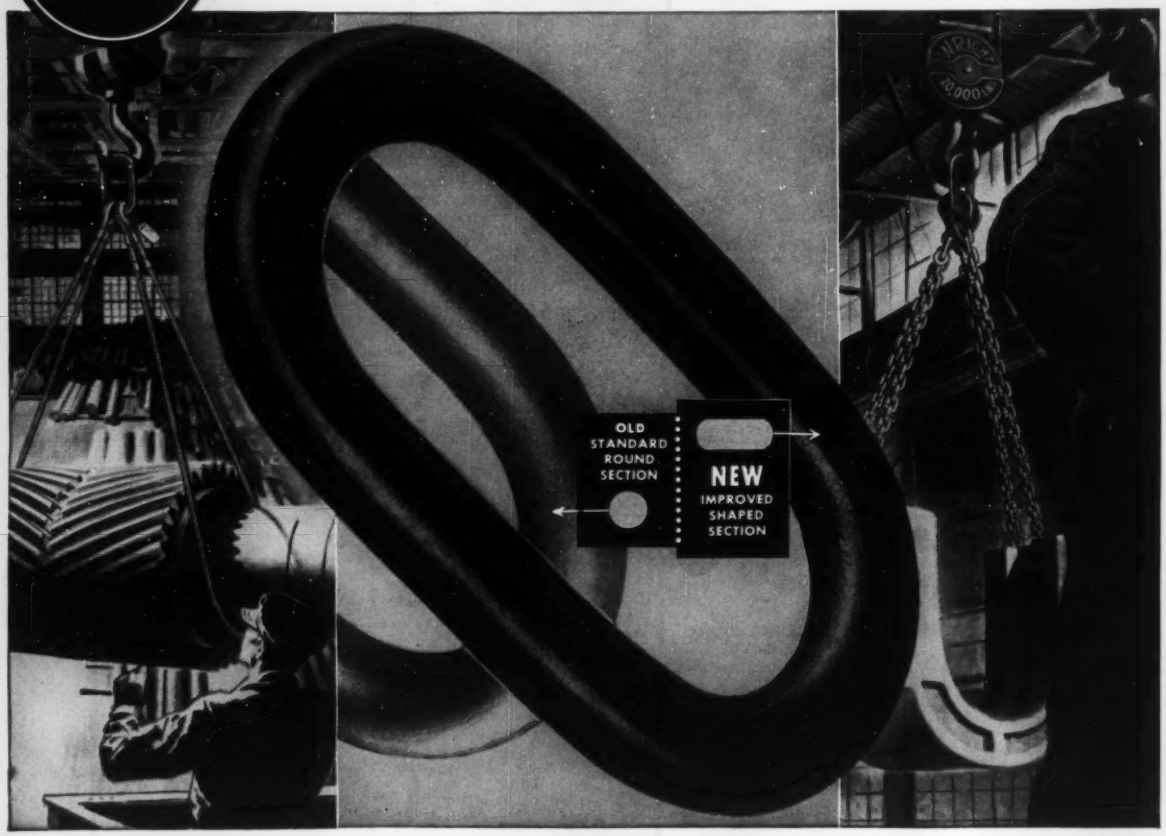
Progress Is Our Most Important Product

GENERAL ELECTRIC

ACCO products

ACCO Registered* Slings–Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



An Extra Bonus of Safety for Slings—
THIS NEW SHAPED MASTER LINK

• ACCO's engineers found that if they shaped the master links for chain and wire rope slings as shown above, these new shaped links would hold their form under loads up to 18% greater than could the old standard round links. The reasons are similar to those which enable a shaped I-Beam to handle greater loads than could the same amount of steel if used as a solid beam.

The new link is smoother and provides a greater factor of safety. It is a better link in many ways. It costs us more to make. Yet it is offered at no increase in price.

"Registered*"—for Greater Safety

Development of this new link is just the latest step in ACCO's continuing program to provide the greatest possible measure of safety and reliability in ACCO *Registered* Slings.

Each component of an ACCO *Registered* Sling is made from the best materials procurable for its use. Each part must prove to have strength equal to or greater than the sling body. All hooks for ACCO *Registered* Slings are Magnaflux tested. Then these components are assembled into slings according to carefully engineered designs that have proved themselves in rigorous field tests.

The completed sling is then individually proof-tested to twice the working load limit for which it is rated. Then, and only then, is it awarded the coveted ACCO Registration Certificate and the identifying ring or tag.

See your Distributor

ACCO *Registered* Slings are readily available from a distributor near you. If you don't know him write to our Bridgeport office for his name.

*Trade Mark Registered

ACCO

AMERICAN CHAIN & CABLE

BRIDGEPORT, CONN.

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

Better Value

(Advertisement)

BRIEFS for buyers of

Molten Salt Bath Cleaners
Caustic Soda
Muriatic Acid
Trichlorethylene

You save up to 75% with this new cleaner for castings

If you use an electrolytic salt bath to desand castings, you can make real economies with VIRGO® Electrolytic Salt, a new, yet well-established Hooker product.

You pay less for VIRGO Electrolytic Salt. Savings can be as much as 75% over comparable salts.

With this product, you remove sand, scale, graphite, and other surface impurities from iron and steel castings in 15-20 minutes. You get a chemically clean surface.

No acid dip. This VIRGO salt works the same as other electrolytic salts, in an 850-900° F. bath, at 6 volts or less. The process requires no acid, unless it is a prerequisite for subsequent operations.

The electrolytic action of the bath leaves casting surfaces resistant to rust; helps *keep* them clean while they await further processing.

To prove for yourself that VIRGO Electrolytic Salt can clean your castings—*for less money*—write us about submitting samples of your work for test cleaning. If you'd like technical data only, just check the coupon.

2 other specialized VIRGO products

Keep your process file up to date with the latest information on these other VIRGO metal cleaning compounds:

1. VIRGO Descaling Salt. For descaling titanium or stainless steel sheet, strip, wire, rods, tubes and other forms quickly, economically, without attacking the base metal.

2. VIRGO Molten Cleaner. Compounded especially for reclaiming parts loaded with rust and organic deposits.

For literature, check the coupon.

You can empty this caustic soda faster

Whether your operators scoop, pour, or shovel flake caustic soda, they'll find this new Hooker drum easier, faster, and safer to work with.

The opening on this new drum is a full 18 inches in diameter—an increase of 65% in opening area. When the drum is inverted, caustic can't pile up around the inside as it does with other standard drums.

You pay no extra for this drum. So if you've been paying a premium price for full-open-head drums of flake caustic, you can now get many of the same advantages, at standard prices. Just specify Hooker caustic soda in the 18-inch-opening drum.

Easy way to figure dilution of muriatic acid

A mark on the coupon will bring you a technical data sheet that shows at a glance how much Hooker muriatic acid you need to make up solutions of various strengths.

The same sheet gives some good advice on the safe handling of muriatic acid, and the specifications of Hooker muriatic.

Even a quick glance at the specs is likely to convince you that the purest muriatic you can buy anywhere is "*Hooker White*" grade. Entirely free of arsenic and free chlorine, this grade contains no more than .003% sulfates, .0001% iron.

You'll discover that our *Commercial Grade* muriatic is only slightly less pure: iron, .0005%; free chlorine, a trace; sulfates, .003%; organic matter, .001%; arsenic, none.

Both grades are available for your use in rubber-lined tank cars in 18°, 20°, and 22° Baumé strengths.

How to cut degreasing costs

You may have wondered if there isn't some way to extend the time between degreaser cleanouts, to get more use from the trichlorethylene you buy.

Well, there is. You see, all trichlorethylene is protected by a stabilizer against heat, light, air, moisture, acids, and active metals such as aluminum.

During normal use, the stabilizers in some brands of trichlorethylene tend to "wear out" or become depleted. That's why you may have to add new stabilizer. Eventually, if stabilizer is not replenished, the bath will "go sour."

But—when you use NIALK® TRICHLORethylene in your degreaser, you *never* have to add fresh stabilizer! You stand a better chance of going a long time between degreaser cleanouts. Why?

NIALK (and *only* NIALK) has **psp**—permanent STAYING power—in its neutral stabilizer. The stabilizer *can't* wear out during normal use. Even after repeated distillations, it's still active—protecting your parts against staining, keeping the bath from "going sour."

If you'd like to learn more about NIALK TRICHLORethylene and what it can do for your degreasing operations, just check the coupon.

Check items on which you'd like more information:

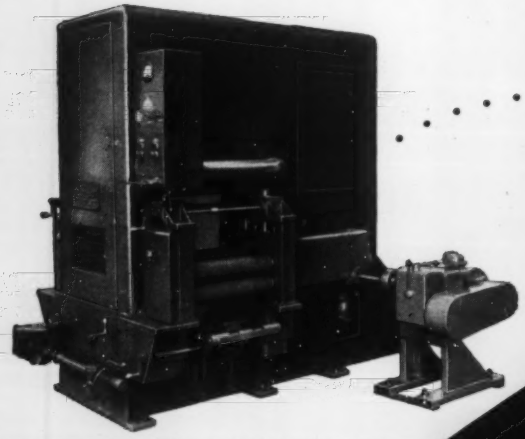
- ☐ VIRGO Electrolytic Salt
- ☐ VIRGO Descaling Salt
- ☐ VIRGO Molten Cleaner
- ☐ Caustic Soda
- ☐ Muriatic Acid
- ☐ NIALK TRICHLORethylene

Clip and mail to us with your name, title, and company address.

HOOKER CHEMICALS PLASTICS

HOOKER ELECTROCHEMICAL COMPANY
1204 UNION STREET, NIAGARA FALLS, N. Y.

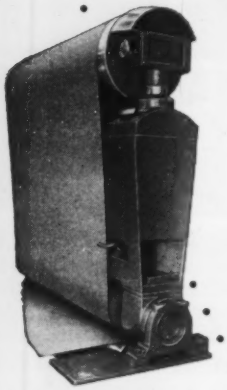
NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES



ABRASIVE BELT GRINDING & POLISHING MACHINE
(Pinch Roll Type)

For pre-finishing, conditioning and polishing sheets, plates, strips or blanked-out shapes in flat form. Used as single units or in multiple units for progressive line polishing.

for FINISHES
that pass inspection
FIRST TIME get a HILL
Grinding & Polishing Machine



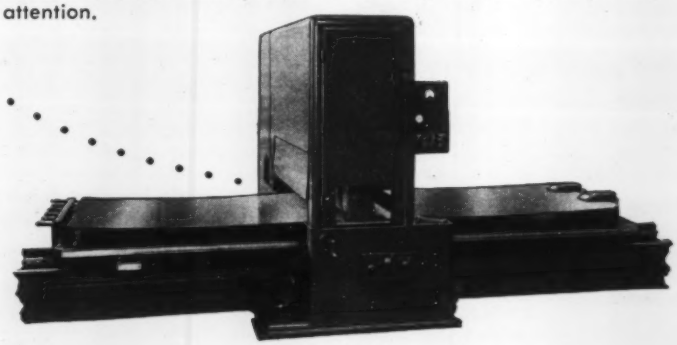
The basic HILL two-roll vertical head with endless abrasive belt. Used in both the Pinch-Roll and the Hydraulic Table types.

● HILL 2-ROLL Vertical Abrasive Belt Grinding and Polishing Machines are made in two general types for producing superior finishes on flat surfaces as required by manufacturers of a wide variety of products such as decorative plastics, auto bumpers, engravers plates, home appliances, etc.

Both types are built in polishing widths up to 60" and larger sizes can be furnished if desired. Your problem will be given our prompt and careful attention.

ABRASIVE BELT POLISHING MACHINE
(Hydraulic Table Type)

For flat polishing of sheets and plates of ferrous and non-ferrous metals. Made in a variety of table widths and lengths with full hydraulic reciprocating table.



THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

BEHIND THE GLAMOR, WEIRZIN® RUST PREVENTION

Production *and* product bonuses are all yours with Weirzin electrolytically zinc-coated steel, as many a manufacturer is finding out.

Take Farrington Manufacturing Co., Needham Heights, Mass., for instance—makers of jewel cases, display boxes and metal radio cabinets. "We make the shells for our cases and boxes out of Weirzin," a spokesman reports. "Its zinc coating prolongs the life and beauty of our Texol® covering materials because it retards rust formation which would cause surface irregularities. Interior rust stains in our delicate satin and velvet lining materials are eliminated. Furthermore, our adhesive bonds better to Weirzin than to plain steel.

"In the matter of die life, we have substantially increased our production of shells between grinds, thanks to the lubricating action of Weirzin's zinc coating."

Weirzin's zinc coating stands up under the most punishing fabrication steps, too. Won't chip, flake, peel; ends costly re-coating of steel parts after fabrication. And *chemically treated* Weirzin takes paints, enamels, lacquers and lithograph inks beautifully; holds them better than any other form of steel; eliminates underfilm corrosion. Investigate Weirzin's superior steel fabricating qualities and flawless rust prevention.

Write Weirton Steel Company, Dept. B-12, Weirton, West Virginia, for free illustrated booklet—"Weirzin."

WEIRTON STEEL COMPANY

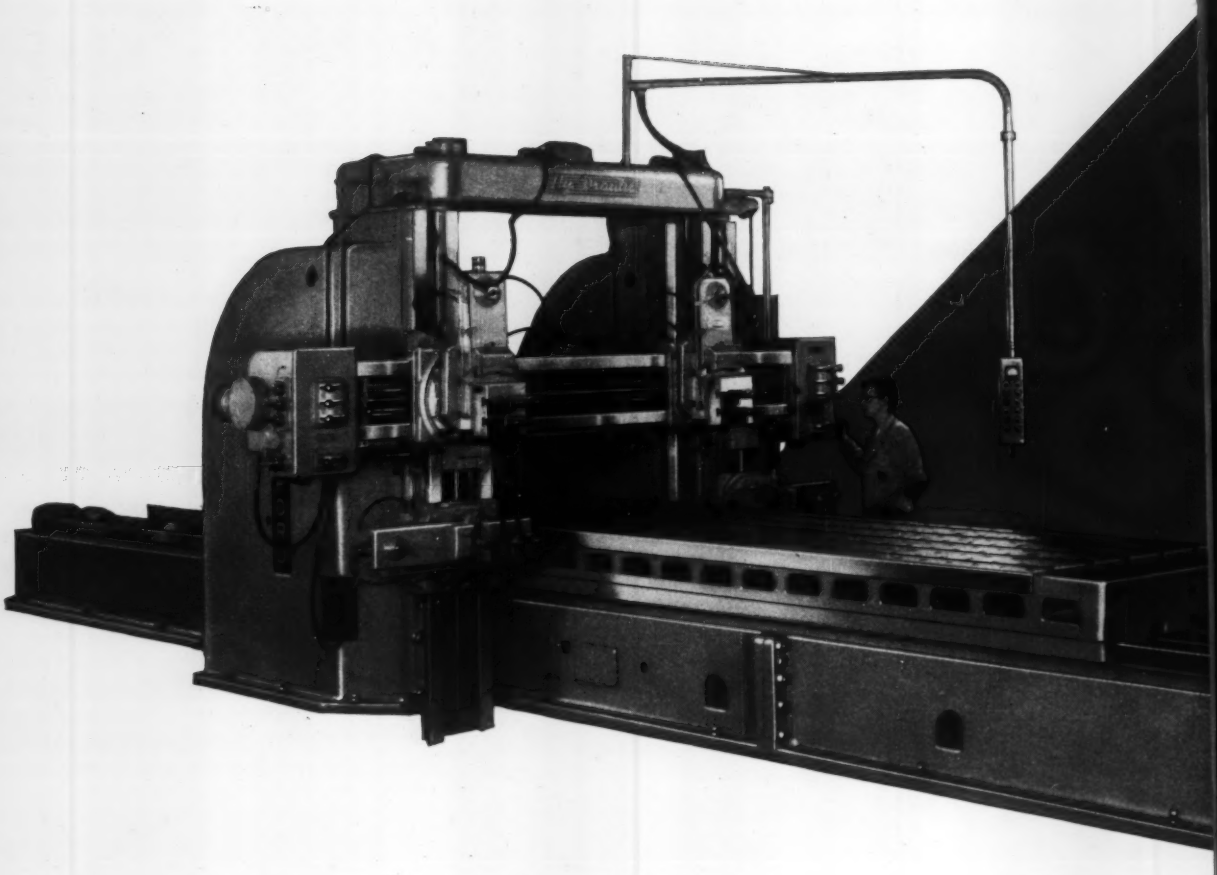
WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

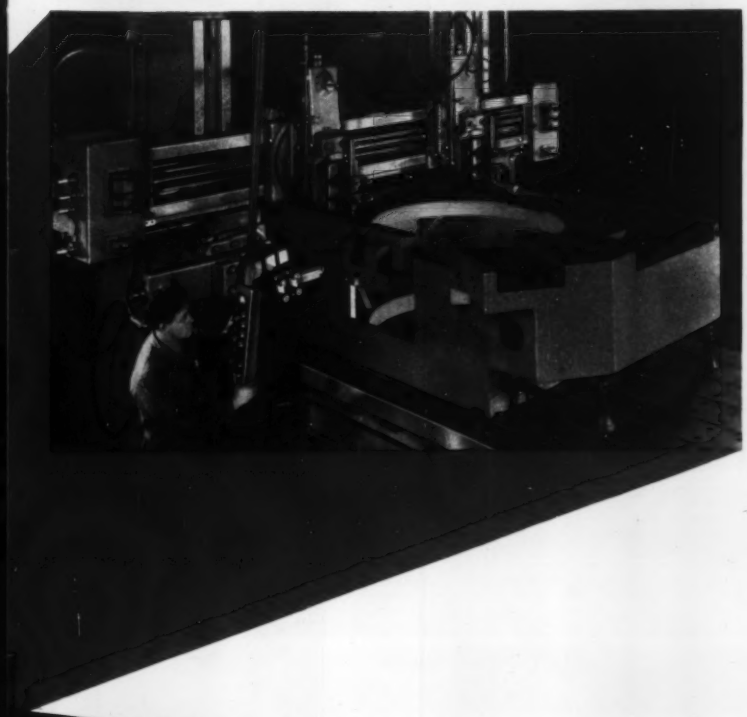
a division of

NATIONAL STEEL CORPORATION

versatility of triple circuit **h3** drive



shown with 4-TON work piece!



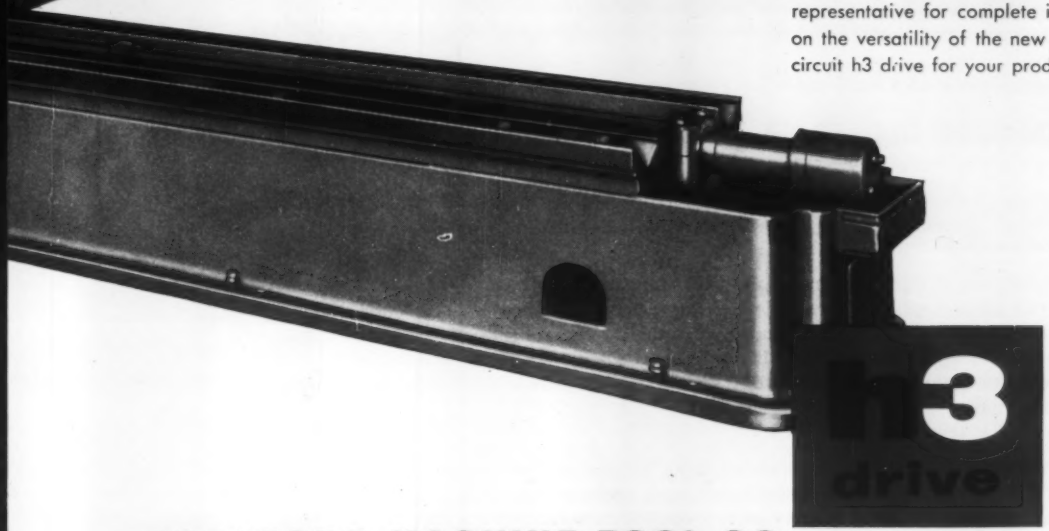
MACHINED ON DOUBLE-HOUSING

ROCKFORD HYDRAULIC PLANER

A Rockford Double-Housing Hydraulic Planer machines this huge casting, using carbide tools on 2 railheads and 1 sidehead. The exclusive hydraulic triple circuit supplies 3 cutting speed ranges for flexibility in changing from one kind of work to another. Pendant control offers selection of low range to 100 fpm., for extreme depths of cut and maximum feeds; medium range to 150 fpm., for average cuts in medium steel or cast-iron; or high range to 300 fpm., for carbide planing of steel and non-ferrous metals.

It is possible for an operator to adjust the h3 drive from 10 to 300 fpm. at the normal operating position, instantly selecting the speed range ideally suited for his individual job application.

See your Rockford Machine Tool Company representative for complete information on the versatility of the new hydraulic triple circuit h3 drive for your production work.



ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

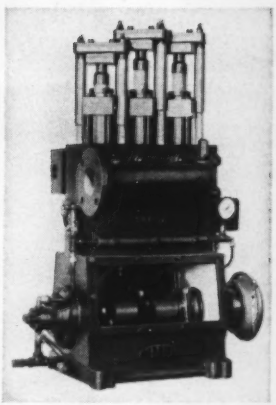
What you need here is an ALDRICH PUMP

The reliability of any central hydraulic system depends on the pump. If it's an Aldrich, you're sure of 100% availability of hydraulic power—with either oil or water.

Dependable service. Aldrich Pumps provide reliable, low-cost performance on such applications as die casting, hydraulic press operations, roll balancing, descaling and hydraulic testing. One reason is the simplicity of the Aldrich Direct Flow design, which permits horizontal straight-line flow from suction to discharge. Another is the reduced space between valves, which results in higher volumetric efficiency.

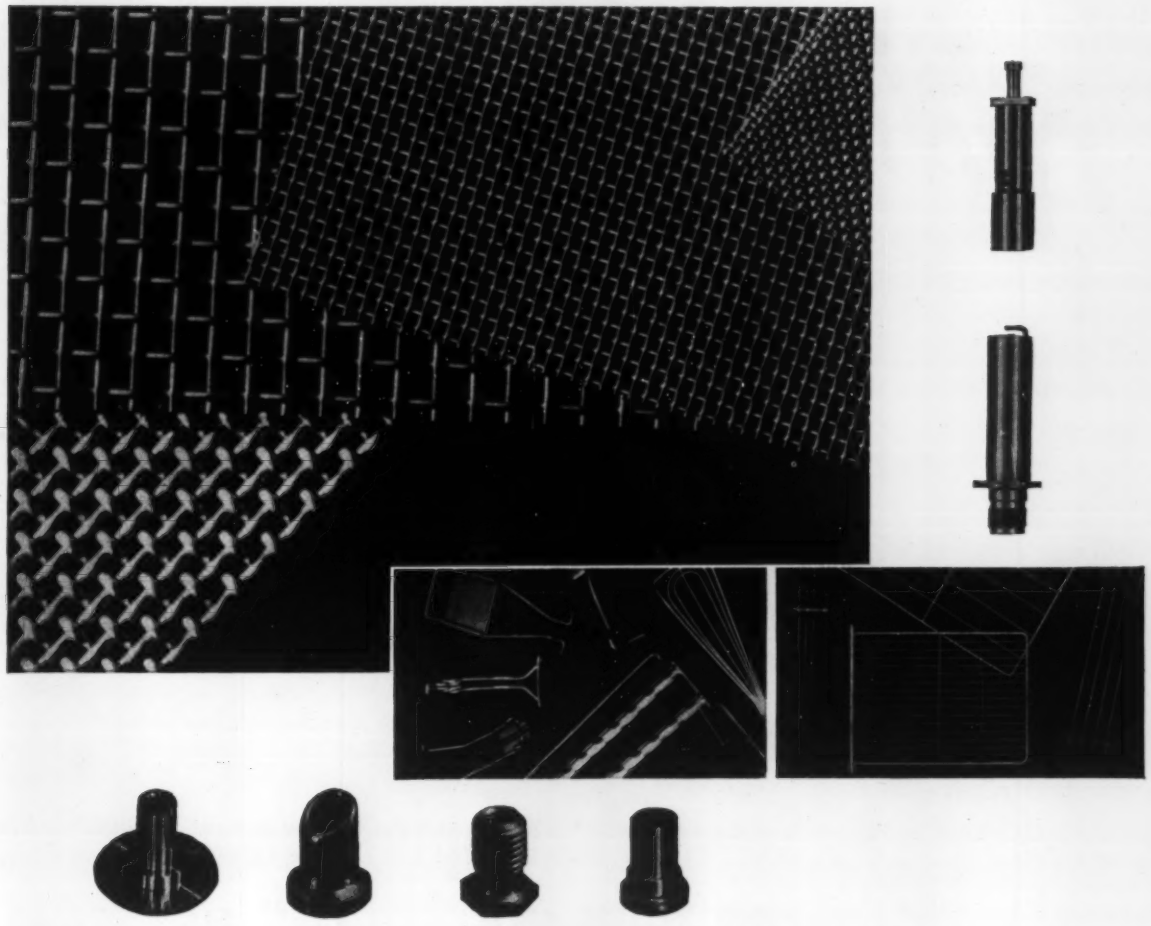
Easy maintenance. Fluid end sectionalization, changeable plunger sizes and interchangeability of parts provide fast, easy maintenance. Parts can be replaced easily and quickly, at low cost. Valves can be removed for inspection or replacement without special tools or equipment. Individual sections of the fluid end can be replaced at a fraction of the cost of conventional type fluid ends.

Get free details. Write today for a copy of Data Sheet 100, a condensed catalog and selection table covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.



Aldrich "Power-Pac" Direct Flow Triplex Pump has no equal in a nominal 25 hp pump for descaling, die casting, roll balancing, press operation, hydraulic testing. Pressures from 390 psi to 20,700 psi.

THE ALDRICH PUMP COMPANY



ALLEGHENY STAINLESS BARS AND WIRE

...Promptly available in the sizes, grades and finishes you want

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ALLEGHENY STAINLESS WIRE

Illustrated 20 page booklet, which fully describes analyses, physical properties, corrosion resistance, principal uses and applications of stainless wire.

ALLEGHENY STAINLESS BARS

Illustrated 28 page booklet, which fully covers alloy selection, fabrication, annealing, heat treating, corrosion resistance and weight of stainless bars.

ADDRESS DEPT. S-882

Whatever your particular application may be, the variety and ready availability of Allegheny Stainless Bars and Wire offer many advantages when the requirement is resistance to corrosion, heat, wear or great stress.

Bars are produced in a complete range of analyses, in the form of rounds, octagons, hexagons, squares, flats and special shapes and sections. They can be furnished in hot rolled, cold drawn, ground and rough turned finishes, heat treated to offer a wide range of properties.

Cold drawn wire of almost all standard grades of A-L Stainless Steel, tempered to provide many correlations of hardness and tensile strength, is obtainable in a wide selection of diameters.

In addition, our Technical Staff is at your service, ready to assist in solving problems of selection and fabrication, and to help you cut shop costs in machining, welding and finishing operations ● Let us handle your stainless bar or wire requirements.

Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.

Make it BETTER and LONGER LASTING with

ALLEGHENY STAINLESS

WSW 6489

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ALLEGHENY LUDLUM

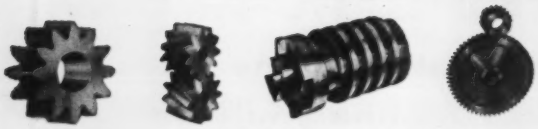
Warehouse stocks carried by all Ryerson steel plants

FUN! with Scott-Atwater's fleet of 9 new outboards

with help from SEWALL GEARS

Outboarding at its exciting best . . . with a model for every need from 3.6 h.p. to 40 h.p. . . . that's Scott-Atwater's new fleet with features such as . . . Raymond Loewy design . . . new color choice . . . "Aquamute" exhaust . . . "Bail-A-Matic" . . . and many others including *full gear shift* with help from Sewall Gears for rugged, dependable service.

Sewall's complete gear service can help you . . . *call us!*



Custom-made gears and sprockets

Sewall gears are made by men who are fussy about specifications. We work in strict accordance with your prints. Gears must be delivered as scheduled. Price must be reasonable. We maintain a wide range of late-model machine tools, inspection instruments and checking equipment to serve our customers across the nation.

Let us quote on *your* specifications!

Write for NEW Bulletin No. A-111

The Sewall Story . . . 4 pages richly illustrated with in-plant photos . . . includes listing of capacities and facilities.

RACKS

available immediately!

We stock Standard Rack sizes from 48 D.P. to 3 D.P. in 6 ft. lengths. Write for PRICE LIST No. SR541 of Racks in Stock.

SEWALL GEARS

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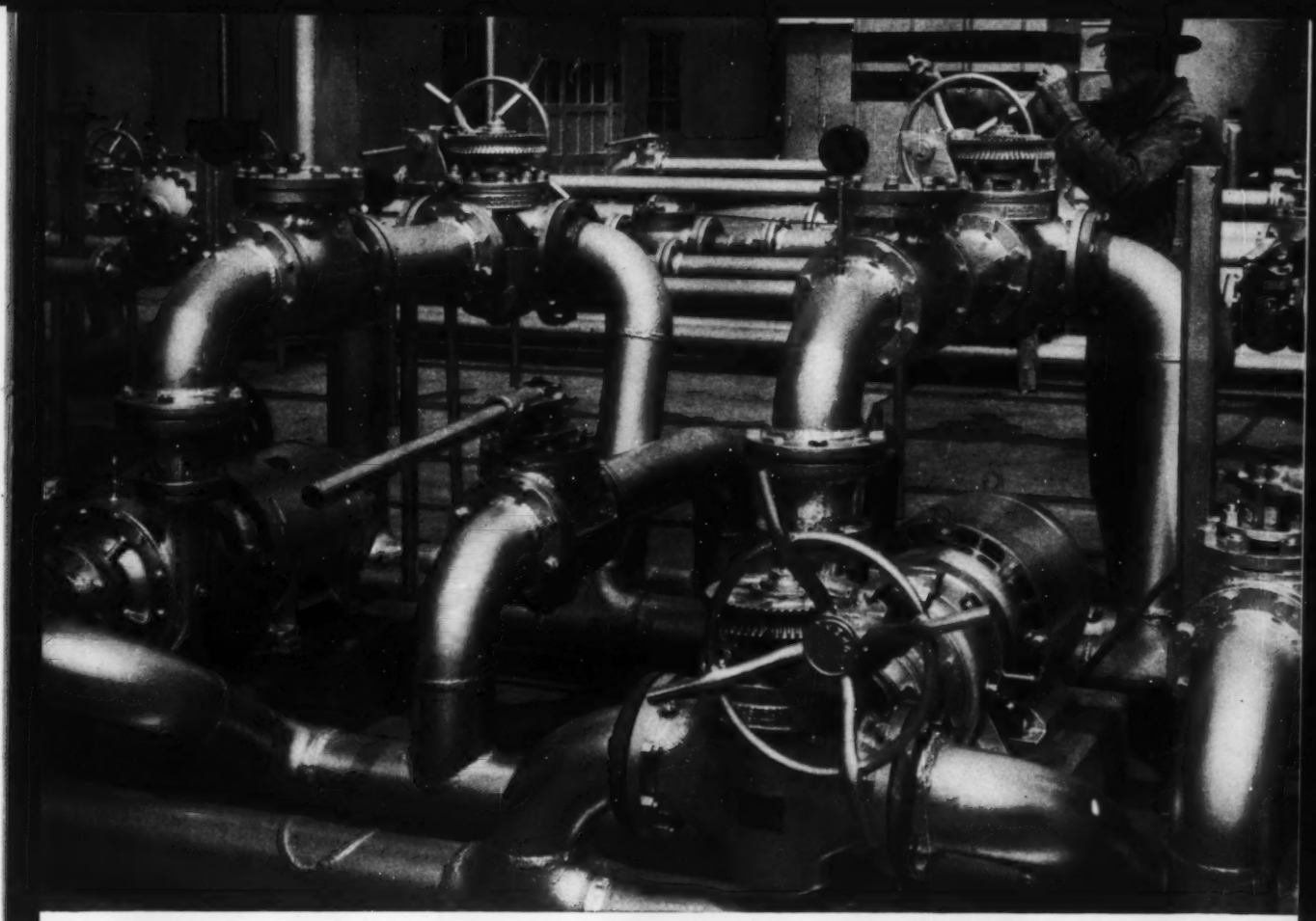


How To Get Tight Shut-off

For tightest shut-off, Rockwell-Nordstrom valves can't be matched by any other valve. Why? Pressurized lubricant forms a continuous, plastic seal around the seat ports for positive shut-off at all times. And Rockwell-Nordstrom valves *stay* leakproof because seating surfaces are *never* exposed to cutting or corrosion by line fluids. They operate easier and smoother, too. In just a quarter-turn, the plug glides freely on a film of lubricant for full opening or closure.

Rockwell-Nordstrom valves cost no more to buy (often less) than ordinary valves. And they cost far less to *use* on any service. Lubricant *keeps* working parts good as new for years. Result: better performance, longer life and lower costs.

Rockwell-Nordstrom valves are available in sizes from ½" to 30" and pressure ratings to 10,000 lb. WOG. You can select from semi-steel, steel, stainless and other corrosion resisting metal patterns to meet your every need. See your nearest industrial supplier or send coupon for complete information. Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers, Limited.

ROCKWELL-
Nordstrom
VALVES
Lubricant Sealed For Positive Shut-Off

SEND COUPON FOR FREE BOOKLET

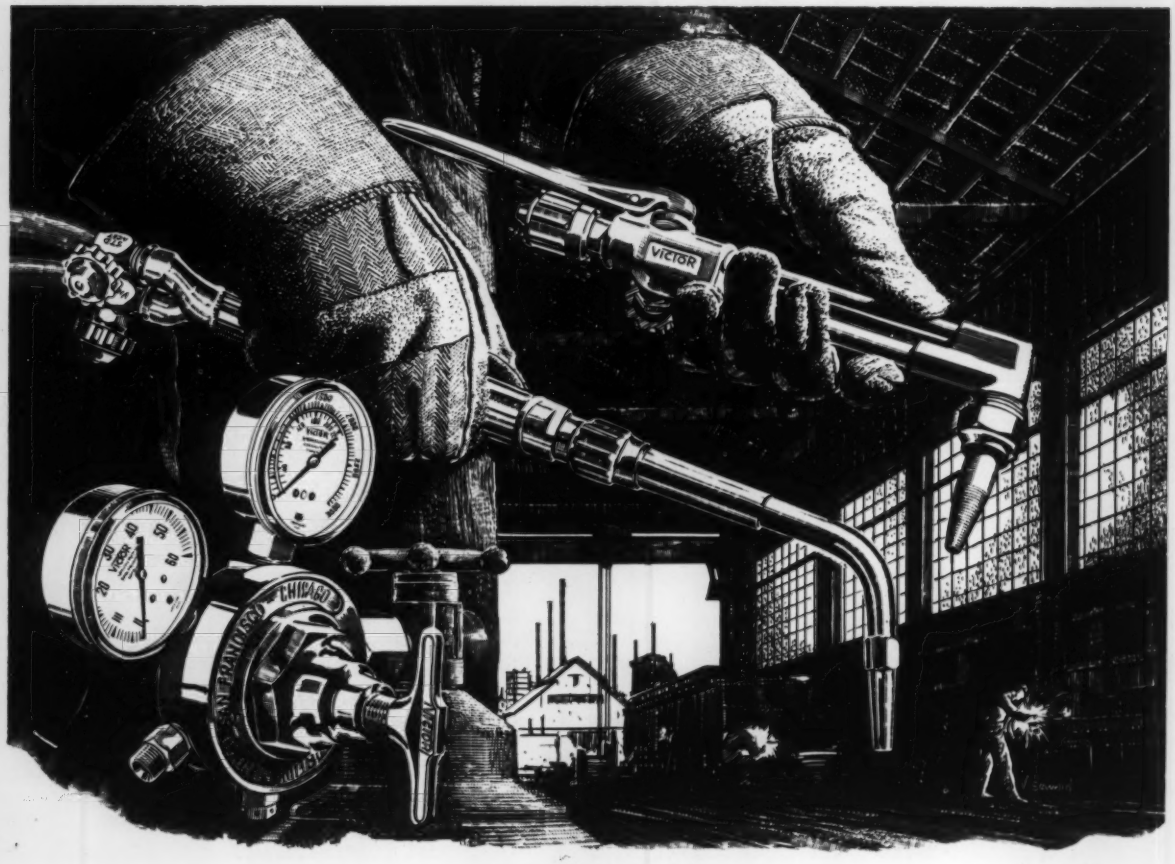
Rockwell Manufacturing Company
Pittsburgh 8, Pennsylvania

☐ Please send me Bulletin V-215
☐ Please send me name of nearest Rockwell-Nordstrom industrial distributor.

Name_____ Title_____

Company_____

City_____ Zone____ State_____



the most flexible tools in the metal working industry

VICTOR COMBINATION WELDING & CUTTING UNITS

FOR EASE OF HANDLING DIFFERENT JOBS . . . Welding, brazing, hardfacing, heating, heat treating, descaling and paint burning. Cutting, trimming, deseaming and weld scarfing.

WITH A WIDE VARIETY OF NOZZLES, TIPS AND CUTTING ATTACHMENTS, with quick-change, hand-tight, time tested sealing ring connections.

RELIABLE FIELD-PROVED REGULATOR DESIGN for safe, dependable pressure and flow control.

See for yourself how easy it is to handle your work when you use Victor equipment. Ask your Victor dealer for literature or a demonstration.

VICTOR for welding

36

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

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How T&W Technique is applied to serve the construction equipment industry better

If you are building construction equipment, investigate *T & W Technique* for producing forgings and deep drawn stampings. At the right are two examples of how a fully coordinated team of engineering and production facilities at T & W's Forging and Stamping Divisions serve industry better.

Send a sample or print of your part, today, for estimates.

SALES OFFICES NEW YORK • PHILADELPHIA
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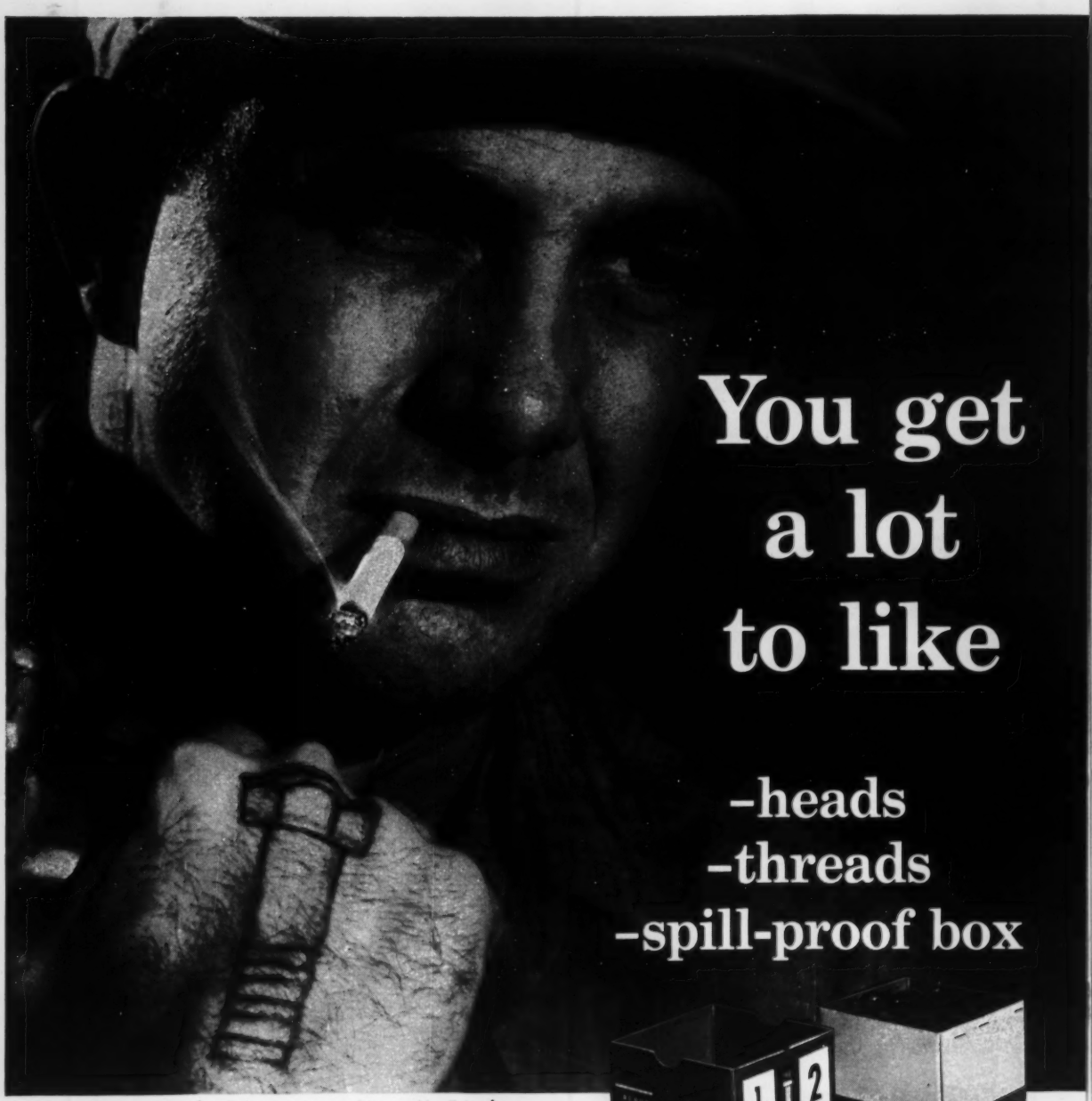
FORGINGS AND DEEP DRAWN **STAMPINGS**

TRANSUE & WILLIAMS
Over 50 years of experience
ALLIANCE, OHIO—USA



(and the man is smoking a Marlboro)

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Attention to Detail Makes Republic Your Best Fastener Choice

In any assembly, production costs and product performance depend directly on the quality of fasteners used to hold it together. And when you specify Republic Bolts and Nuts, you get attention to detail that goes far beyond simply meeting established industry standards.

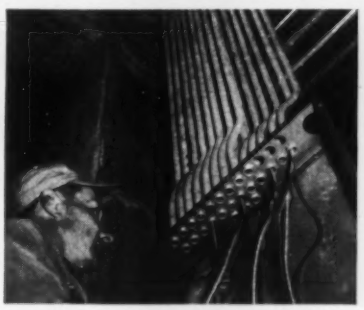
To begin with, Republic is in complete control of the material used in fastener manufacture. From ore mining through steelmaking to completed product, metallurgical and mechanical testing assure substantial margins of safety in final fastener performance.

Further, the machines used in bolt and nut forming and threading are periodically checked for accuracy. You get clean full-depth threads, and true, full-size heads for trouble-free wrenching and maximum holding power.

Finally, Republic's inverted package design, plus high-visibility labels, simplify handling and inventory problems.

So don't just order fasteners, *select* Republic and be sure of the best. Over 20,000 standard and 8000 special types and sizes are available. Send coupon for full information.

YOUR BEST CHOICE OF STEEL SHEETS, in terms of your production and application requirements, is Republic. For example, the corrosion resistant zinc surface on Republic Continuous Galvanized Sheet won't crack, flake or peel under the most severe forming operations. Republic ENDURO® Stainless Steel provides easy workability plus lifetime beauty. Republic Electro Paintlok® provides an excellent paint base, and retards corrosion even if the surface is scratched through. For details on these and other sheet products, send coupon.



ATTENTION TO YOUR NEEDS makes Republic ELECTRUNITE® E.M.T. your best electrical-raceway choice. This strong, light tubing provides the protection of steel, yet is readily cut to length and bent to fit. "Inch-Marks" on every length make accurate installations easy. The "Guide-Line" helps keep bends in the correct plane. Inside knurling requires up to 30% less wire-pulling effort. These features are exclusive with Republic ELECTRUNITE Electrical Metallic Tubing in the popular sizes. Send coupon for literature.

CHOOSE REPUBLIC STEEL PIPE for all of your assemblies requiring ease of installation and dependable operation. Formed by continuous butt welding of uniform flat rolled steel, Republic Steel Pipe provides good concentricity for accurate threading and joining. Uniform ductility assures smooth bends. Welding characteristics are unsurpassed. Pipe walls are galvanized for protection inside and out. Republic Steel Pipe is available in all popular sizes. Contact your Republic representative, or mail coupon, for data.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3422
3120 East 45th Street
Cleveland 27, Ohio

Please send me further information on:

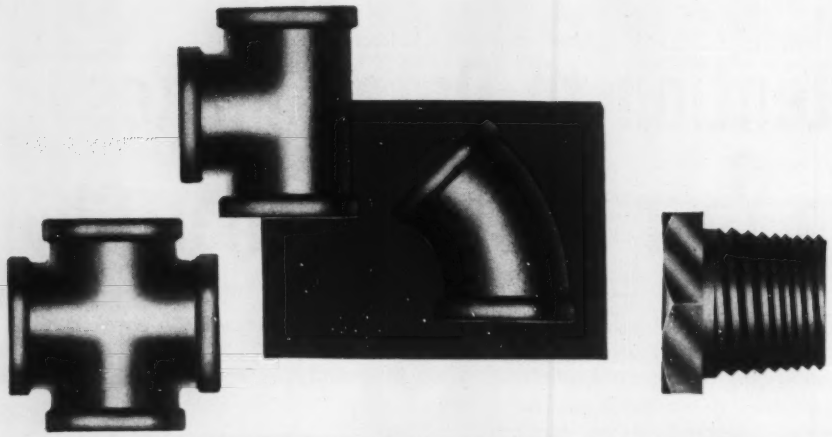
☐ Fastener Products ☐ ELECTRUNITE E.M.T.
☐ Sheet Products ☐ Steel Pipe

Name_____ Title_____

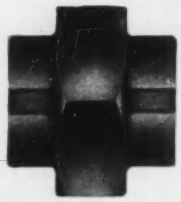
Company_____

Address_____

City_____ Zone____ State_____

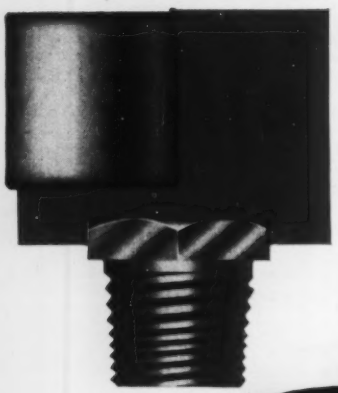


YOU CAN BEAT CORROSION



ESCO CAST STAINLESS FITTINGS SOLVE CORROSION PROBLEMS

Conveniently warehoused in *ESCO* Alloys 45 (Type 316), 40 (Type 304), 20 (ACI CN-7M) and Hastelloy B and C. *ESCO* 150 lb. PSI fittings and flanges are stocked in the standard range of types and sizes in screwed, flanged and welding styles. Special cast fittings are available, or can be made to engineering specifications in any size and in all analyses. Alloy designation is "in-the-metal" on all fittings.



See your nearest ESCO dealer—he can help you solve your corrosion problems. Ask for ESCO Catalog No. 175.

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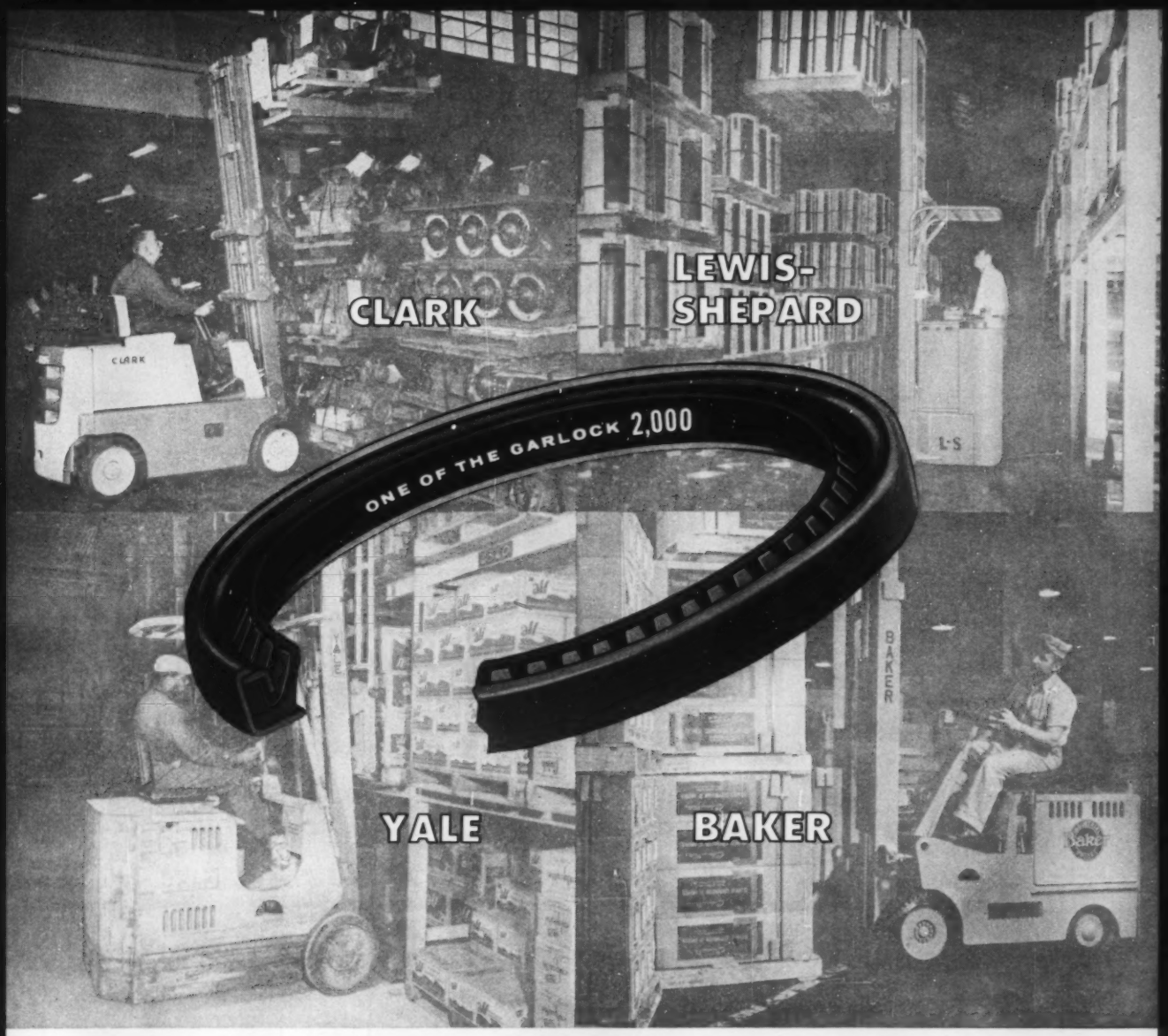

Why Leading Lift Truck Makers Specify Garlock KLOZURE* Oil Seals

The standard sealing element in a Garlock KLOZURE Oil Seal is a unique synthetic material molded to very accurate dimensions. It is non-abrasive, free-running; oil, grease, heat, and cold resistant; impervious to water, mild acids, and alkalies. It is also extremely durable and resilient.

That's why 20 leading Lift Truck manufacturers use KLOZURE Oil Seals for sealing-in bearing lubricants, and for protecting bearings from the abrasive action of dust and dirt.

For unusual service requirements KLOZURE Oil Seals are supplied with sealing elements made of silicone rubber for temperature extremes; or Teflon to resist strong acids, and other chemicals.

If you have a sealing problem, why not ask your Garlock representative for his recommendations from "The Garlock 2,000" . . . two thousand different styles of packing, gaskets, and seals for every need. It's the only complete line. Call Garlock today, or write for KLOZURE Oil Seal Catalog No. 20.

*Registered Trade Mark

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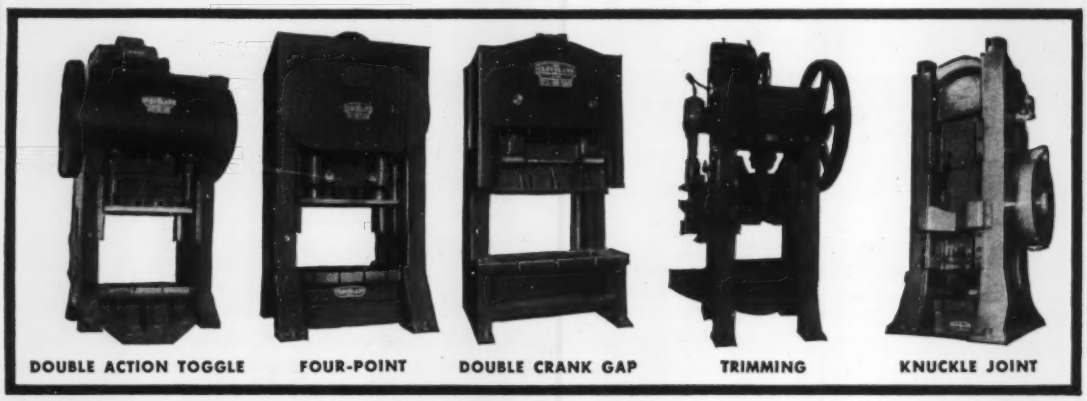
Cleveland Presses

help keep your plant competitive



If you do volume stamping, production-wise and cost-wise there's no better way to protect your competitive position than by prompt replacement of outmoded presses.

High stamping and maintenance costs are the penalty of inefficient press operation. Don't let them rob you of the cost of new, efficient presses.

Now's a good time to check your older press performance records. You may find that you're already paying for new presses . . . *without their benefits.* If so, you can make no better investment than the purchase of *new* Cleveland Presses equipped with the Cleveland (patented) Drum Type Clutch. Our engineers will gladly help you select the *right* Cleveland for your needs. Write or call today!

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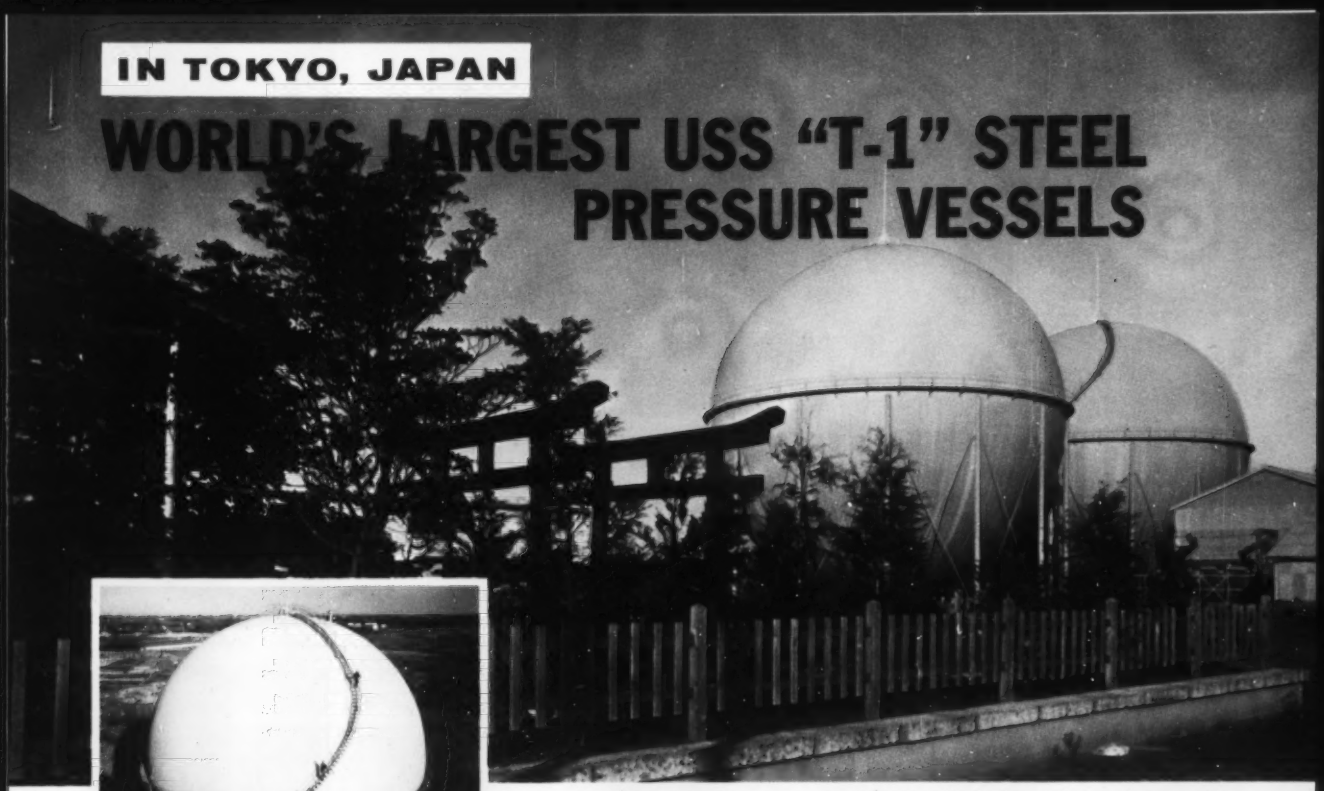
THE CLEVELAND PUNCH & SHEAR WORKS CO.

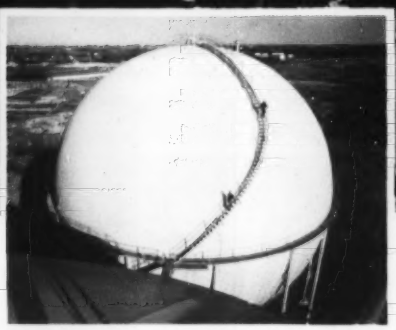
Established 1880

IN TOKYO, JAPAN

WORLD'S LARGEST USS "T-1" STEEL PRESSURE VESSELS

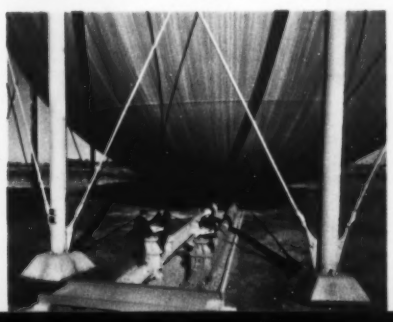


Beyond the Shinto shrine are the two USS "T-1" Steel spheres. They are being used by Tokyo Gas Works, Ltd., for the storage of natural gas at a pressure of 71.1 psi.



Lightweight construction—made possible by USS "T-1" Steel—cut shipping, handling and erection costs of these giant pressure vessels.

Thinner walls meant less weld metal required, less erection time needed. Lightweight construction also reduced amount and expense of foundation.



COMPARED TO CARBON STEEL CONSTRUCTION, the use of USS "T-1" Steel saved 1,720 tons of steel in the two giant pressure vessels pictured here. Having a diameter of 110.5 ft. each, they are the largest Hortonspheres ever built for the storage of gas. USS "T-1" Steel enabled Chicago Bridge & Iron Company to use 0.73-inch-thick shell plates rather than mild steel plates 1.75 inches thick.

USS "T-1" Steel's very high yield strength (90,000 psi minimum), plus previous experience in building non-code government vessels, permitted use of a maximum allowable working stress of 36,000 psi to which a 90% weld joint efficiency was applied. With the exception of the working stress values, the vessels were built to the ASME Code for Unfired Pressure Vessels where applicable.

In addition to saving 1,720 tons of steel, the thinner USS "T-1" Steel plates drastically lowered the cost of shipping to Japan. And each ton saved meant lower erection, welding and foundation costs. Added up, all these savings point out why the use of USS "T-1" Steel spells economy.

Shell plates were fabricated at CB&I's Greenville, Pa. plant and shipped to Tokyo for field erection. Field welding was done with E 12016 electrodes and did not require stress relief. All welds were 100% X-rayed.

Two additional vessels of similar design, but smaller in size, are now being fabricated by Chicago Bridge & Iron for installation in Tokyo.

USS "T-1" Steel is being used to improve performance and reduce costs in a wide variety of applications in steel mills, in mining equipment, in construction equipment, in materials handling equipment, in bridges, and even in steam turbines. Write for complete information about its application and fabrication. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

"USS" and "T-1" are registered trademarks.

UNITED STATES STEEL

Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time).

USS

"Here's the trick: quench this forging so it won't warp,"

says **A. H. Sauer,** *USS General Foreman—Heat Treating*

In the whole complex business of steelmaking, heat treating of the finished part is one of the steps that requires *exceptional* care. The problems are multiplied many times over when you have a 74-ton forging like the one in the picture—a flange forging for a nuclear power reactor.

In forgings, heating and quenching operations must be carefully controlled to insure proper structure in the steel. Using the acquired skill that only time and experience could give him, Al Sauer, a 29-year veteran in our Homestead Forgings Division, supervised the careful heating of this forging for five days. After this came the rapid quench; the entire piece was immersed in water. Then, Al had the crane lift the piece until only the lower flange was submerged. With careful timing, the piece was then submerged again for an over-all quench.

If the entire piece had been immersed for the complete quench, the thinner top section would have cooled too fast, and the resultant contraction may have warped the entire forging. But in this case, through Al's experience and supervision, the warpage was kept within practical limits.

We're not suggesting that this is the forging problem of the century. But it does show the kind of demanding assignments that are *routine* in the shop that makes USS Quality Forgings.

If you'd like a free copy of our 32-page booklet, "USS Quality Forgings," just write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts . . . carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

specialty forgings of all types

USS

UNITED STATES STEEL

NOW AVAILABLE COAST TO COAST FROM WAREHOUSE STOCKS

USS FREMAX

the free-machining plate steel that

- cuts machining costs
- prolongs tool life
- speeds output
- gives smooth surface finish

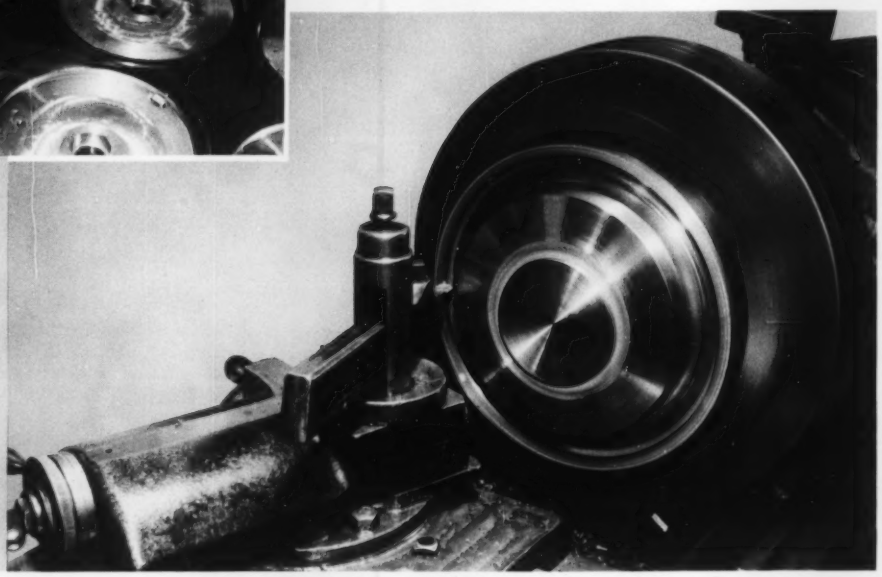
USS FREMAX is a low carbon, high sulphur, free-machining plate steel that is far superior to ordinary carbon plate steels for such machining operations as cutting, drilling, knurling, milling, broaching, shaping, turning and threading. *Tests show that* FREMAX *can be machined at cutting speeds 100 to 200% greater than SAE 1020 plate steel while still maintaining the same tool life,* thus enabling you to obtain higher production and lower cost per item.

You will find USS FREMAX ideally suitable for dies and molds where a smooth, unblemished surface finish is a prime factor. FREMAX is easy to weld, enabling you to make strong, sound, tight welded joints.

We can give you immediate delivery on USS FREMAX plate steel. Just phone, wire or write us at Chicago, or contact any of our warehouses.

Prompt Delivery

from your nearest warehouse



This core for a rubber brake seal mold shows the fine surface finish obtainable on USS FREMAX plate steel.

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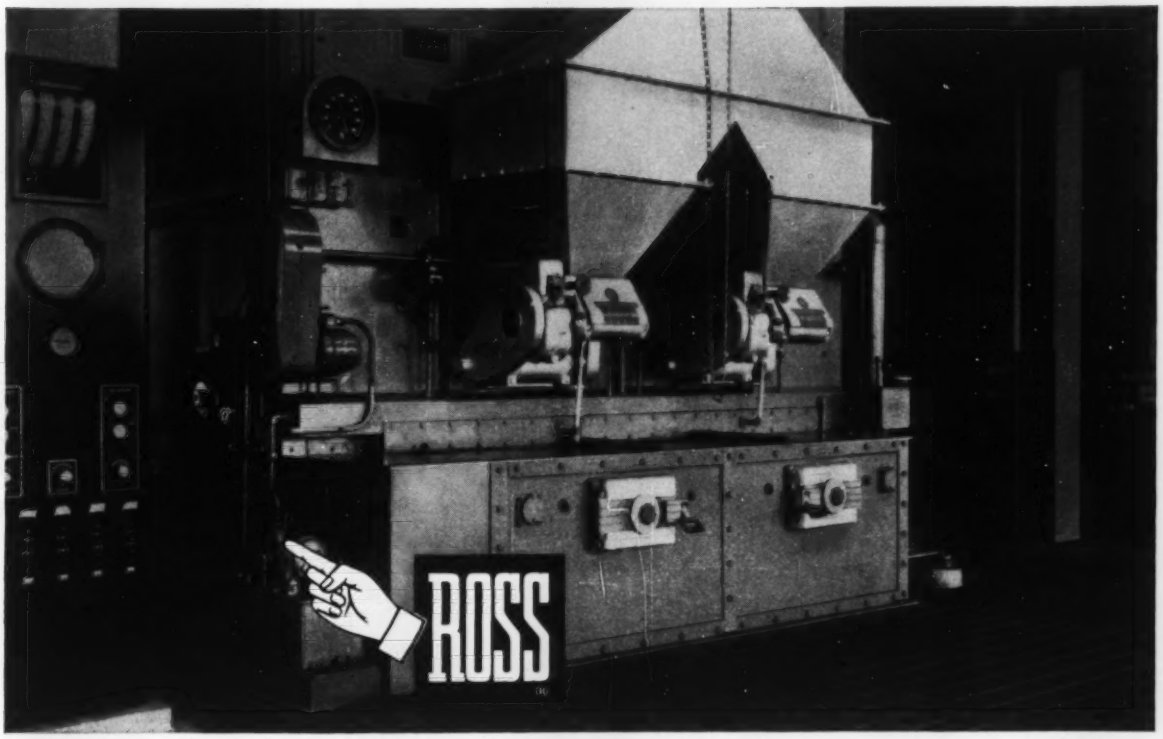
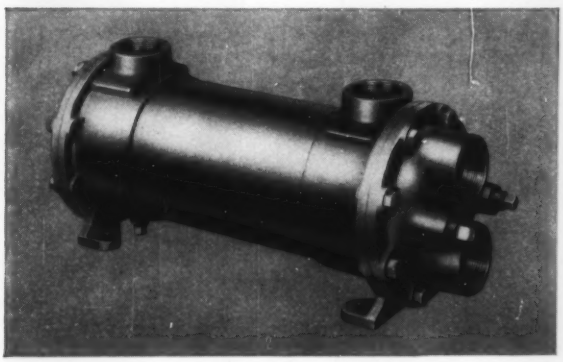


Hydraulic ash discharge grate works around the clock on this AE Stoker

ONE OF FOUR INSTALLATIONS at an Ohio automotive plant, this AE Perfect Spread Stoker is under continuous operation, 24 hours a day. Serving a boiler with 80,000 lbs. per hour capacity, the hydraulically driven ash discharge grate helps deliver maximum combustion efficiency.

RUGGEDNESS AND DEPENDABILITY have made Ross Exchangers the choice to cool the hydraulic fluid here. "Ross Exchangers," says American Engineering, "are used to avoid overheating of the oil in the hydraulic system, thus assuring proper operation and maximum life of equipment."



USING PAST EXPERIENCE as a basis for selection, numerous manufacturers of hydraulic equipment install Ross Exchangers with impressive regularity. They can be found wherever there is need for high thermal efficiency and the ability to withstand punishing hydraulic surges...on stretch wrap formers, die casting machines, welders, metal drawing presses, powdered metal presses, plastic molders and fluid drives.

WHY NOT look into Ross Exchangers yourself? Completely pre-engineered and fully standardized, they're available in a wide range of sizes to meet your heat transfer requirements. Request Bulletin 1.1K5 for complete details. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS HEAT EXCHANGER

Division of AMERICAN-Standard

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GREY IRON CASTINGS

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ONE OF THE NATION'S
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ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

You wouldn't cut out paper dolls with a hedge clipper!!

Then why shear 6-inch wide material with a 10-foot shear?

Cutting a small piece of light metal, plastic or rubber on a big shear is even more expensive than it is exasperating. Yet many shops, out of necessity, tie up big shears with small work.

That problem is solved by the New Lodge & Shipley 24" Speed Shear. Specially designed for fast cutting of small pieces, it has a capacity of 1/8" x 24" mild steel. Its unique work table is provided with holes which allow fast set-up of guides, templates and protractors for production of straight-side blanks at speeds up to 120 strokes per minute.

A 24" Speed Shear may easily pay for itself merely in freeing a big shear from wasteful small jobs. Investigate its possibilities in your plant. For detailed Bulletin No. PS-12, write: **The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio**

Lodge & Shipley

A. P. GREEN
KX-99

KX-99 firebrick linings in hot metal cars and hot metal mixers provide extra tonnage that means extra savings

The superior toughness and uniformity of KX-99 in hot metal car and hot metal mixer linings has provided such outstanding service records, many leading steel companies have standardized on their use.

The exceptional properties of KX-99 brick enable them to better withstand erosion and slag action. Uniformity of size permits laying up KX-99 with very thin joints to better withstand the scouring and washing action of molten metal.

KX-99 LINING IN HOT METAL CAR.

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REFRACTORY PRODUCTS
SERVE THE WORLD'S INDUSTRIES

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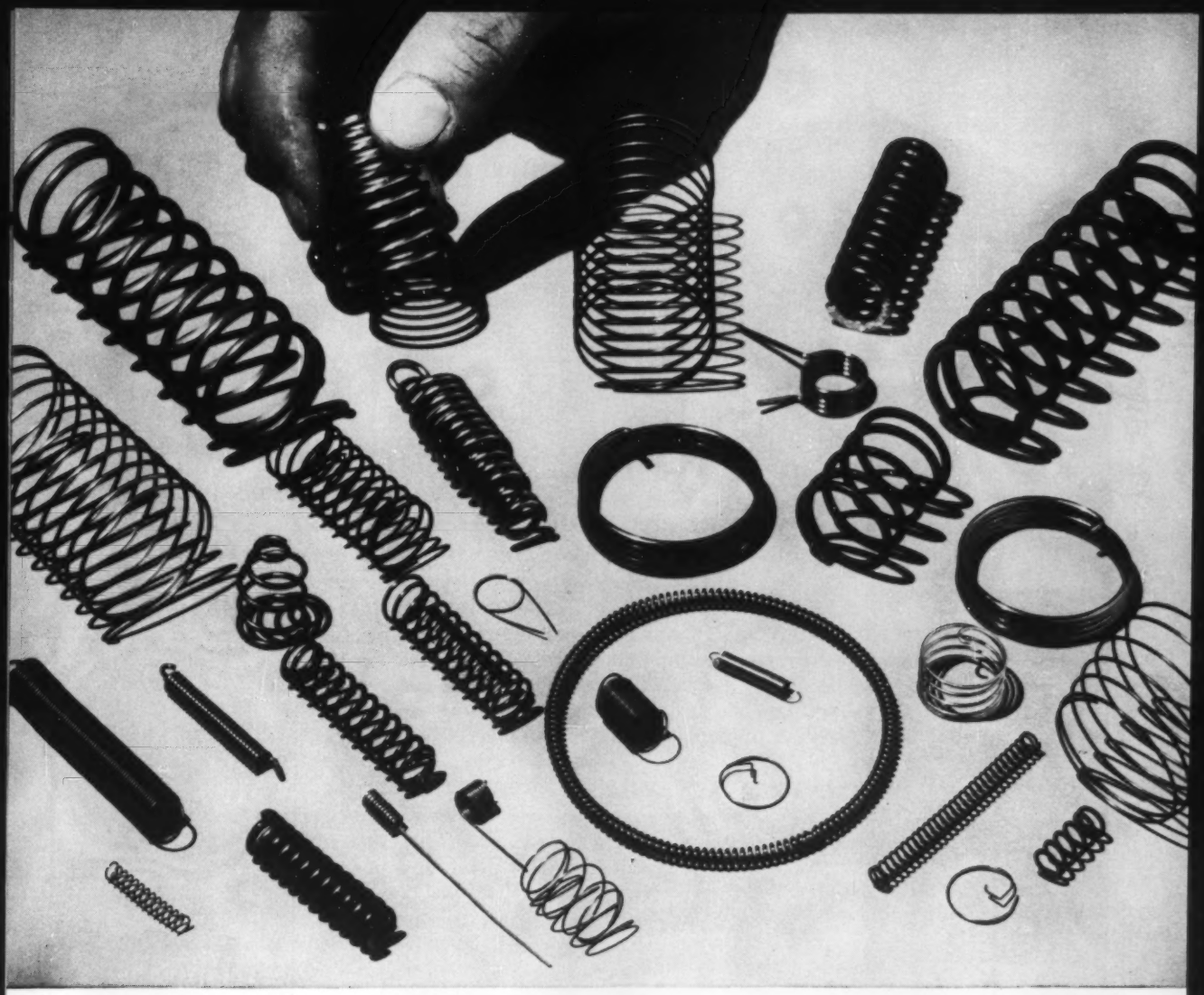

How the right "COAT" solves many spring problems

● Unless you yourself go in for forming wire springs, you have no idea what a tricky business it is. For one thing, as every fabricator knows, it takes extreme uniformity in the wire to obtain the precise dimensions and the exacting tension, torsion or compression characteristics so often required.

But uniformity alone won't always do the trick! As a leading supplier of special wire for tougher-than-usual spring requirements, National-Standard has delved deep into production problems and has come up with answers that help many a fabricator hold better to tough specifications and produce faster with less waste and more profit!

Time and again, for example, National-Standard has shown that merely a change in wire *coating* or lubrication quality is of major importance in forming operations. Proper coating also helps gain uniform dimensional response to heat treating. Quite often, in fact, troubles chalked up to wire variance are really the fault of improper coating or finish.

Helping fabricators solve problems and cut costs is a National-Standard specialty. We're geared for it and make a point of it. Try us and see!

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

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NATIONAL-STANDARD Company
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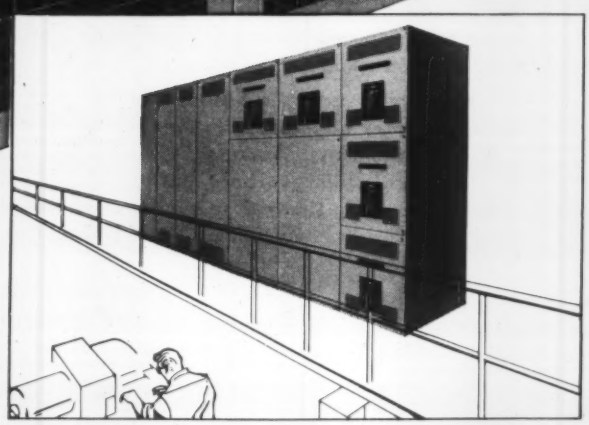
WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

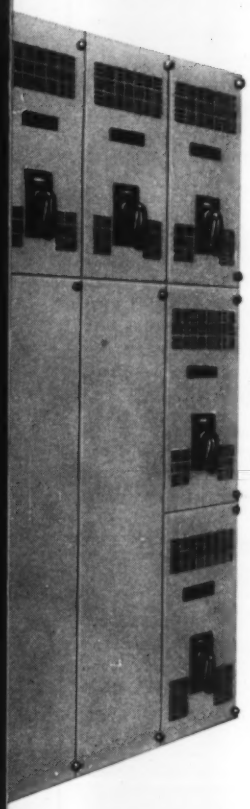


BALCONY or mezzanine installations save floor space, put power closer to load.

Long bus runs are expensive

for utilization voltage

YOU'LL SAVE WITH POWER CENTER CLOSE TO LOAD



The cost of distributing power at utilization voltage in your plant can—and does—run into fancy red ink figures. Line losses multiply. Voltage drops. Motors run hot—heaters run cool—lighting efficiency fades.

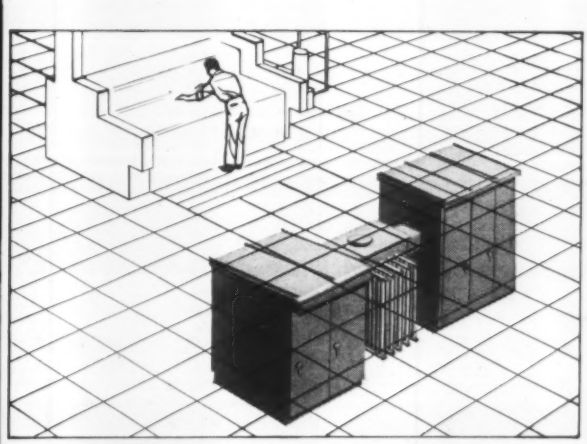
Westinghouse power centers can stop these losses and, depending on the size of your operation, the savings can pay for the initial investment in a surprisingly few months.

Westinghouse dry-type power centers are lighter. You can put them in the basement, put them on mezzanines—get closer to load, save space. They're packaged—transformer, breakers and associated equipment all factory assembled to specification—ready to set down and connect. They're simple to maintain—no liquids to reclaim, drain and replace. They're fire-safe—safer for personnel—more reliable for continuity and protection.

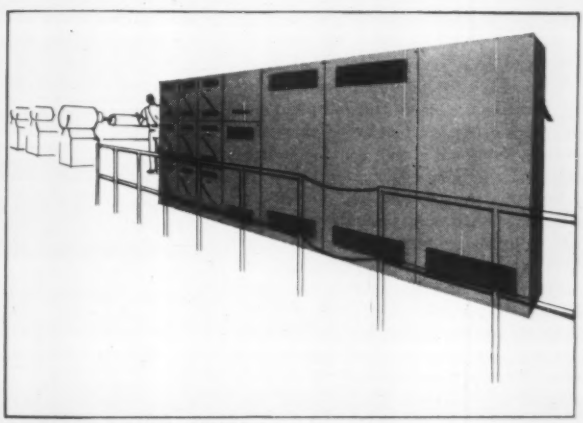
You can't afford not to expand or modernize your plant power distribution with power centers. Get the whole story from your Westinghouse sales representative—or your electrical contractor. Or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, requesting *new* D. B. 34-150.

J-60902

YOU CAN BE SURE...IF IT'S Westinghouse



BASEMENT or underground vault may utilize either ventilated or sealed dry-type power center.



DRY-TYPE POWER CENTERS take a minimum of space even when placed in the middle of production areas.

(Advertisement)

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

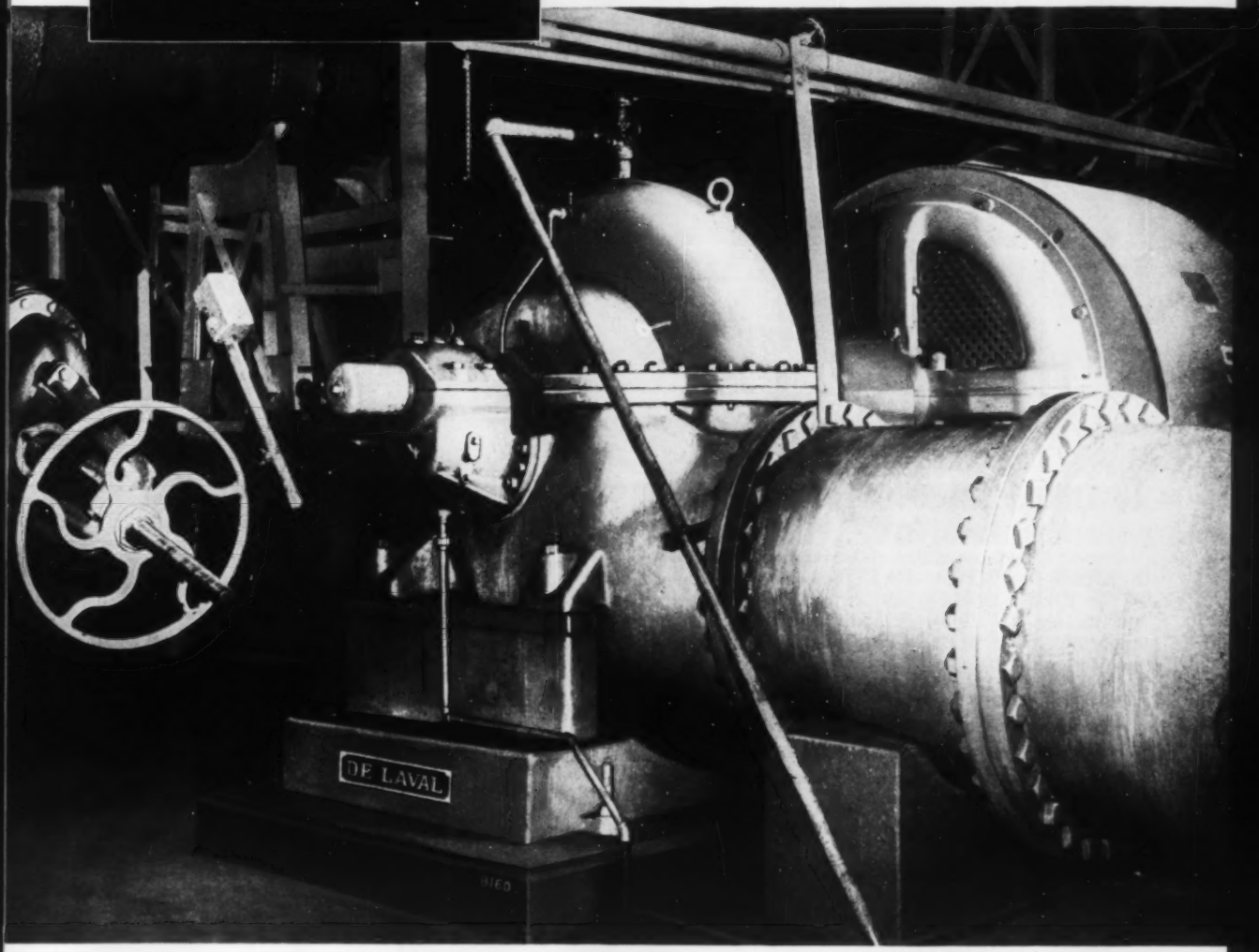
In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

DE LAVAL
CENTRIFUGAL
PUMPS

in service since 1911 at Inland Steel Co.



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all.* The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.

Send for Bulletin 1004 giving performance and application data.

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

DL384

Now... KENDEX* boring bars

bring all the advantages of the Kendex principle to turret lathe boring operations

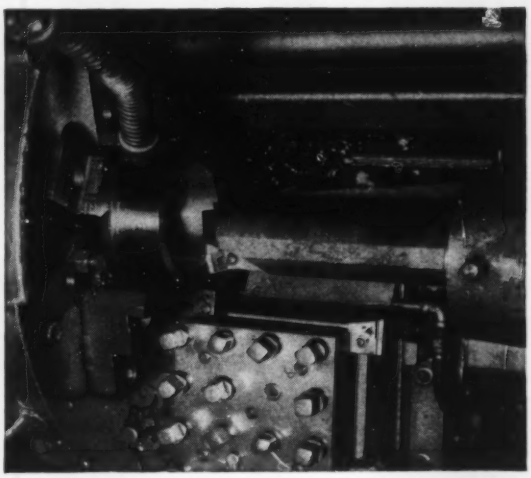
Exhaustive tests on different turret lathes** prove that Kendex Boring Bars provide all the benefits and economies of the Kendex principle now enjoyed in turning, facing, and milling operations. In addition, and probably more important in boring operations, Kendex Boring Bars provide the following advantages over other types of bars:

- **the cutting point is brought down to the center line of the bar**
- **greater support of the cutting edge is provided**
- **better chip control (uses standard Kendex chipbreaker plate)**
- **boring operations performed better at higher speeds made possible with Kendex bar**
- **permits use of thin insert—greater resistance to thermal shock**
- **throw-away insert permits use of harder grades—greater resistance to edge wear at higher speeds**
- **cutting inserts index accurately (saves time on size adjustment)—less downtime**

Kendex Boring Bars, with the right grade of "throw-away" Kennametal* insert, can be used for both rough and finish boring of pieces up to several inches in diameter. The bar with 15-degree lead angle and square insert together with the bar for turning to a square shoulder with a triangular insert will take care of practically all boring operations—thus eliminating the need for a variety of styles.

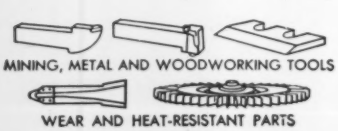
Why not call your Kennametal tool engineer to demonstrate these new Kendex bars? He will also help you select the right grade of Kennametal insert for each boring operation. Or write for additional information, KENNAMETAL INC., Latrobe, Pennsylvania.

*Trademarks
**Tests made on Warner-Swasey, Jones & Lamson, Gisholt and other turret lathes



Kendex Boring Bars for Turret Lathes with Kennametal "throw-away" inserts . . . eliminate costly grinding . . . index accurately without resetting tool . . . reduce machine downtime . . . slash cost per cutting edge . . . resist thermal shock . . . permit boring to close tolerances . . . better chip control (chipbreaker not shown in illustration at top of page)

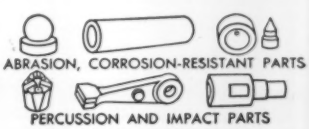
C-3003



MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

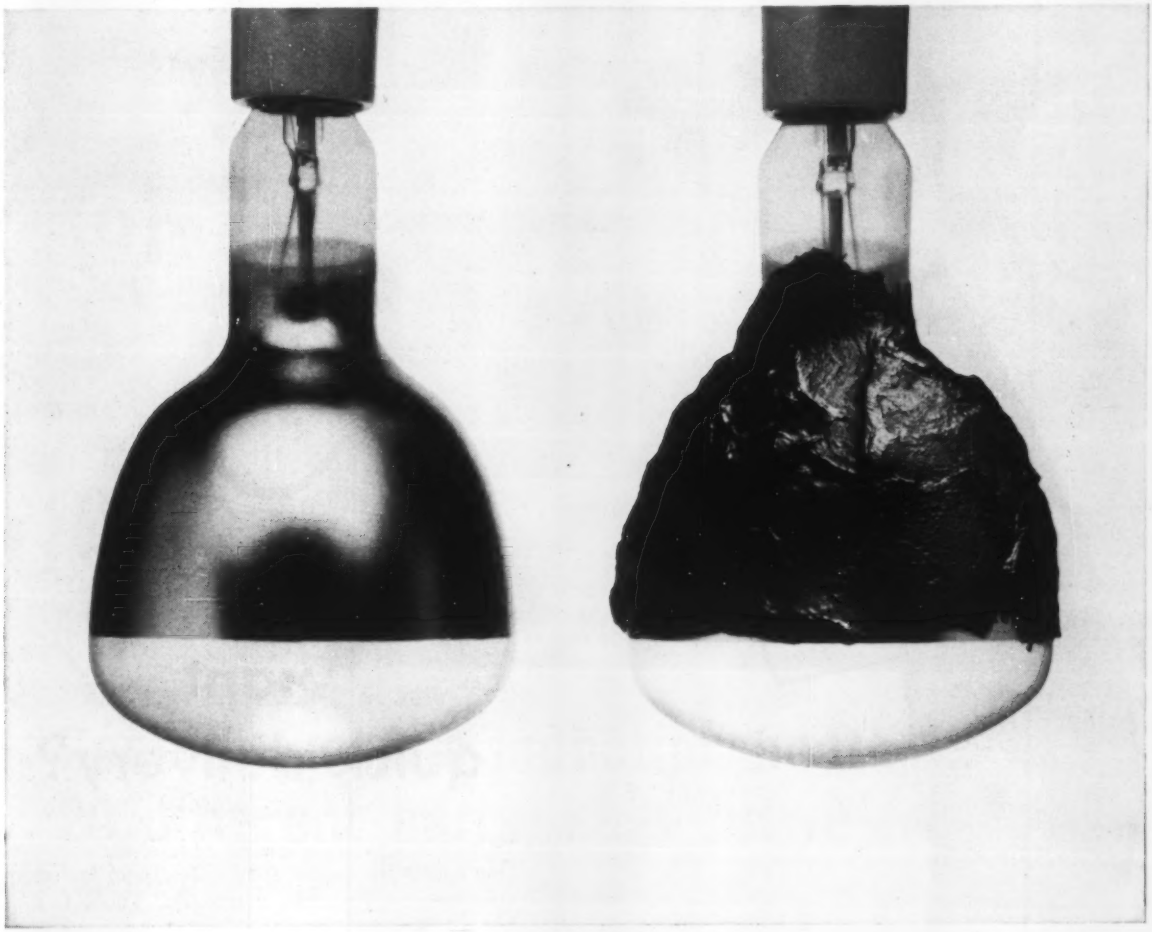
INDUSTRY AND KENNAMETAL ...Partners in Progress



ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

G-E LAMPS GIVE YOU MORE FOR ALL YOUR LIGHTING DOLLARS



Which General Electric Reflector lamp gives the most light—*and why?*

A THICK coating of tar was smeared on the surface of the right hand lamp where dirt normally collects in use. But in this type of G-E Lamp, it makes no difference. *Both lamps still deliver the same amount of light!*

Why? The important facts are: Dirt just can't get *inside* to the pure silver reflector, sealed in the bulb. Hardly any dirt collects *outside* on the bulb bottom where all the light comes from. That's why light output is practically unaffected by dust and dirt. And since they seldom if ever need cleaning, maintenance costs take a sharp drop.

General Electric *Filament* Reflector Lamps are available in 500-watt, 750-watt and 1000-watt sizes with pure silver reflectors. G-E *Mercury* Reflector Lamps are available in 400-watt (silver or phosphor reflectors), and 1000-watt (phosphor reflector) sizes.

SWITCH TO G-E REFLECTOR LAMPS (Filament or Mercury) YOU'LL GET MORE LIGHT, SAVE ON MAINTENANCE, TOO!

Your General Electric Lamp Representative will be glad to help you pick the best one for your plant. Call him today—or write: General Electric Large Lamp Dept. S-4, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

want quick delivery?

Don't wait for special steels! Get them *fast* from your nearby Crucible warehouse. You'll find it has a full range—and the service is always tops, whether you order by the pound or ton.

So, for fast, nearby delivery of any type of special steel, call Crucible—*big enough to serve you, small enough to want to.*

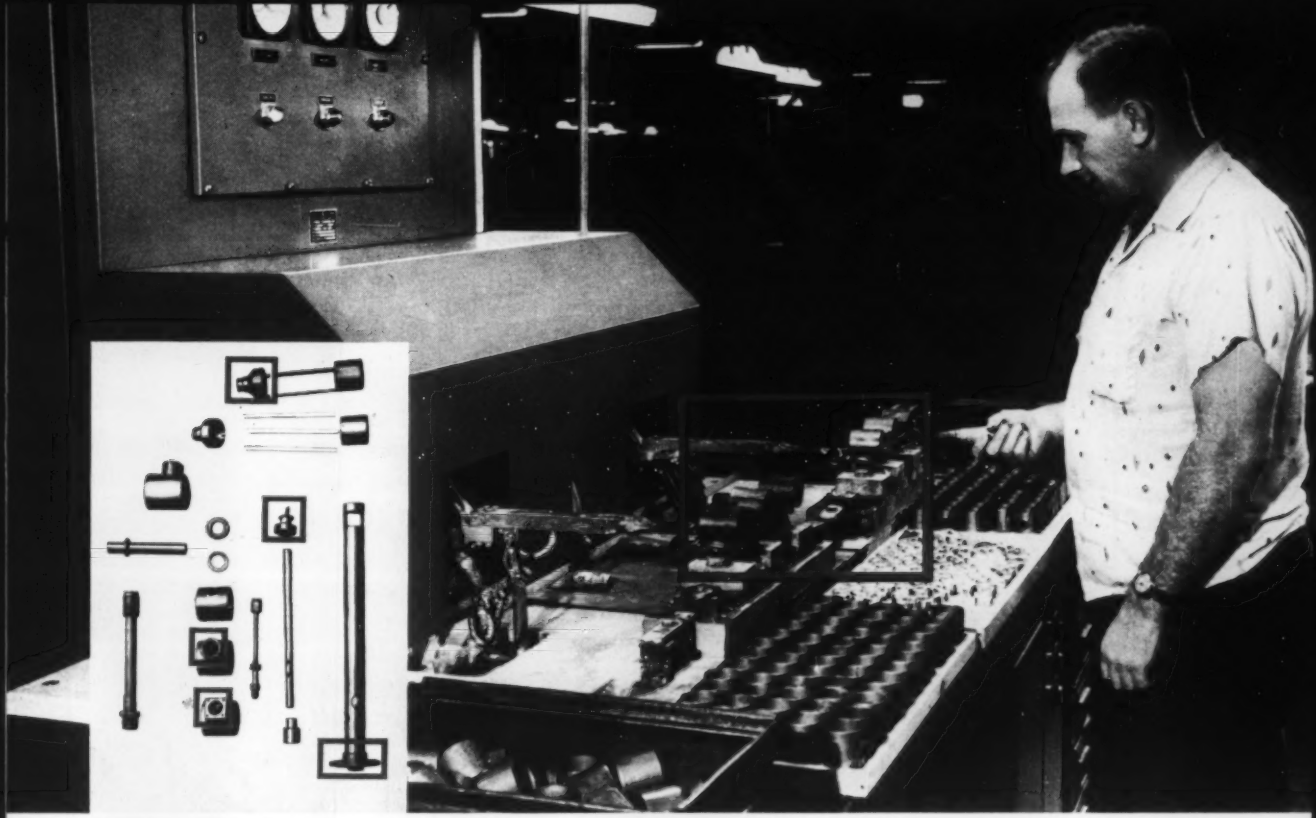
Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy, Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.



AT HARTFORD MACHINE SCREW CO.—

General Electric induction heaters braze 20 different parts, help cut rejects 91%

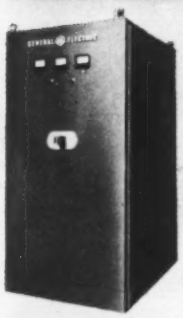
At Hartford Machine Screw Co., a General Electric electronic induction heater is used for brazing a wide variety of parts for electric-switch housings and jet engines.

The General Electric unit takes on jobs ranging from ¼-inch to 1½-inch tubing. After brazing, each part undergoes a regular 500-pound pressure test, and the aircraft work must pass radiographic inspection. With the General Electric induction heater, rejects have been reduced 91 per cent, from 30-35 per cent to a maximum of two per cent.

"If we need another induction heater, it definitely will be a General Electric," says A. O. Haversat, plant engineer. "The output control alone makes it virtually a MUST. This feature is just what we need for our kind of production. It eliminates guesswork and costly human errors. And it cuts out excess tooling, while still assuring uniform brazing."

General Electric electronic induction heaters are available in four ratings—7½-15-, 25-, and 40-kw, with a choice of four different models in each rating. The four models provide various control combinations, so you can buy the one induction heater which best matches your production pattern from the standpoint of both rating and control.

For more information, send in the coupon below or contact your nearby General Electric Apparatus Sales Office



Four models in each of four ratings; 7½ Kw, 15 Kw, 25 Kw, and 40 Kw.

General Electric Co.
Section 722-6
Schenectady, N. Y.

PLEASE SEND ME A COPY OF BULLETIN GEA-6388

NAME_____

COMPANY_____

STREET_____

CITY_____ STATE_____

GENERAL ELECTRIC

STEEL

Frogs and Florists

Florists keep flowers in place by sticking the stems into the sharp pins of a florist frog—sharp pins that are often made from hard drawn, low carbon CF&I-Wickwire Pin Wire which is free from scratches and other surface imperfections.

Chances are you don't need wire to make florist frogs. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES

Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE

Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE

Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE

Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

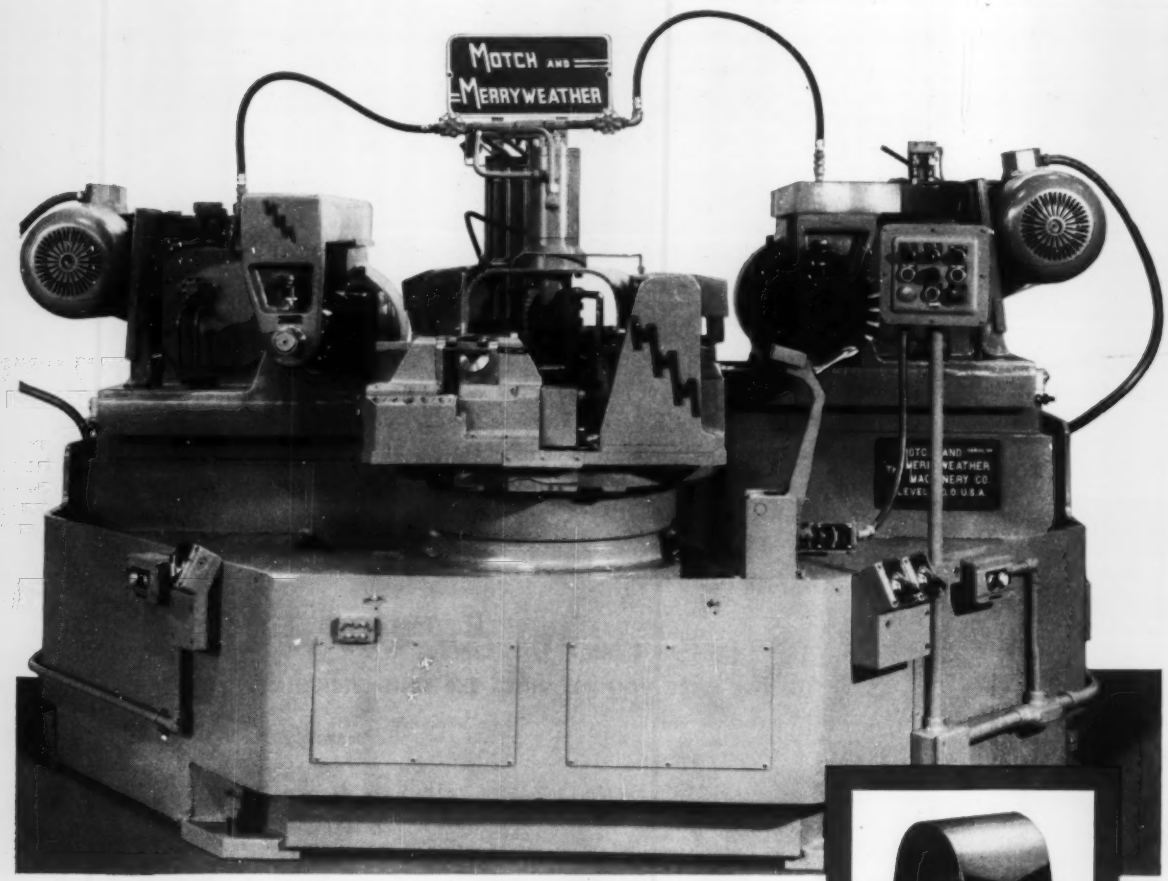
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICE IN CANADA: Toronto CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

CF&I

4242

Another specialized machine by M & M



Special duplex milling machine

for milling and slotting chain links

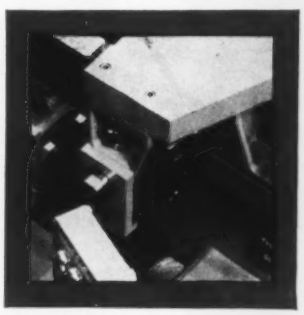
Operation—Straddle and form mill on right hand station, slot or straddle mill on left hand station.

Universal—Six different sized parts run over this machine.

Cycle—Either automatic or manual cycle. Cycle time, 64 seconds.

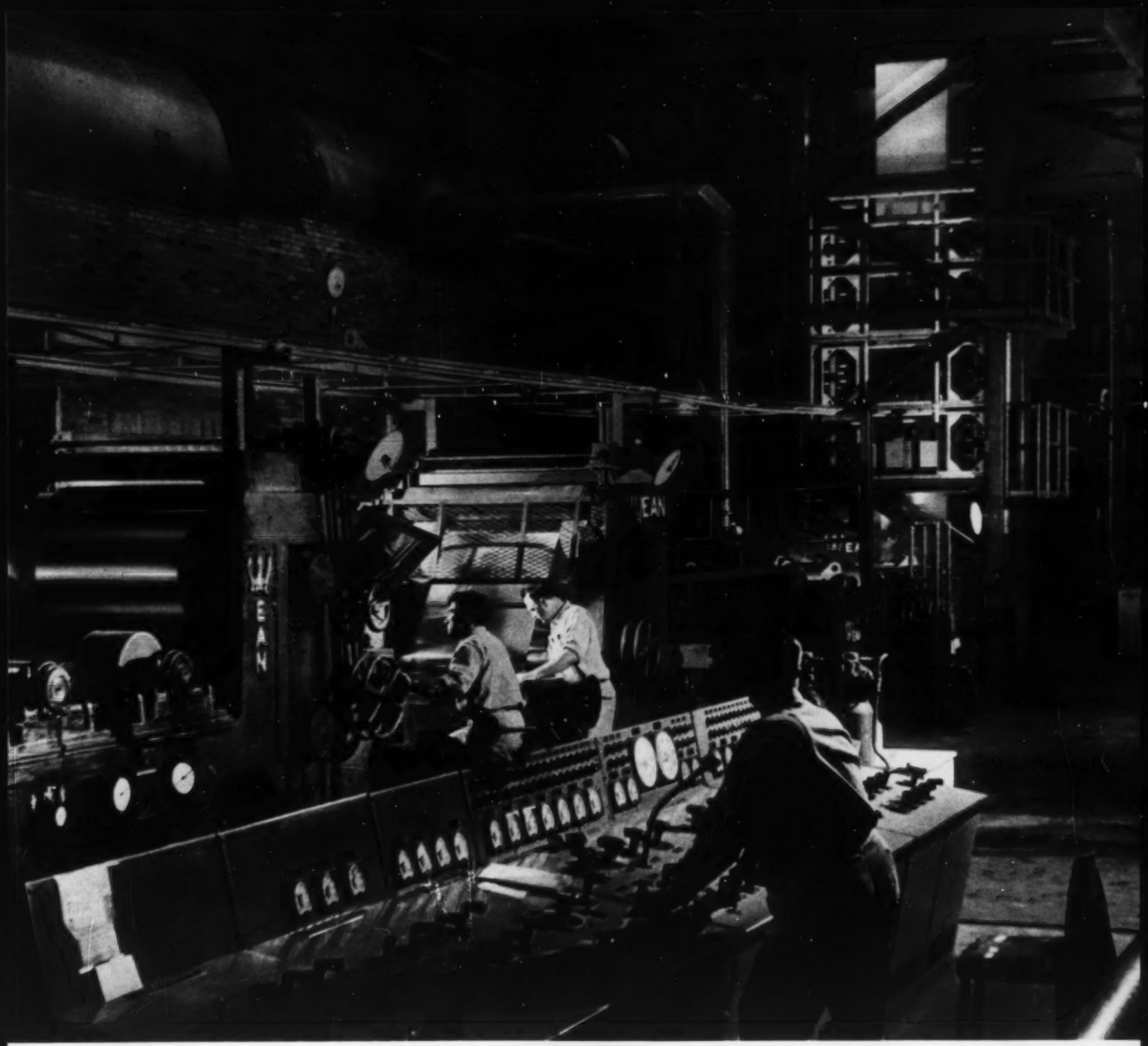
Feed—Custom-designed and built hydraulic head feed, index and clamp.

Fixtures—Four fixtures are mounted on index table.



Heavy welded steel construction, annealed milling head and rugged, all-helical gear train in heads assure continuous production with a minimum of maintenance and costly downtime.

The
MOTCH & MERRYWEATHER MACHINERY
Company
MACHINE TOOL MFG. DIVISION
CLEVELAND, OHIO



More tin plate . . . mirror finish, precise alloy

Westinghouse line drive and control equipment for exacting, high-speed reflow methods helps your electrolytic tinning lines produce more salable tin plate . . . faster.

Here's how you can give your tin plate a competitive edge

YOU CAN BE SURE... IF IT'S Westinghouse

With Westinghouse radio-frequency equipment . . .

Smooth, lustrous tin plate at speeds of 2100 fpm, and beyond

Westinghouse equipment for tin-plate reflow operations helps you produce the delicate alloy balance necessary to form tin cans easier, maintain high production rates.

Westinghouse radio-frequency induction heating equipment for high-speed lines . . . both horizontal and vertical acid type . . . keeps coating thickness precise and constant by automatically adjusting plating current in proportion to line speed. Electromagnetic induction, transferring power to the strip without physical contact, melts the tin and creates a bright, nonporous surface.

This process works so fast that it produces an actual flow line on the moving strip. A photoelectric scanner continuously scans the flow line and uses it to maintain heating at the precise, desired level. There's no overheating or underheating . . . the electric equipment is capable of maintaining speeds of 2100 fpm and beyond. You save valuable tin, reduce menders and boost output of prime tin plate. Production scheduling is simplified because photoelectric scanner handles most changes in gauge and speed without adjustment.

How Line Control Operates

Magamp* magnetic amplifier regulators (VR) control voltage of the entry, main and delivery generators assuring fast, even acceleration and deceleration and minimum loop variation during steady operation. Loop regulators act as verniers in controlling generator voltages.

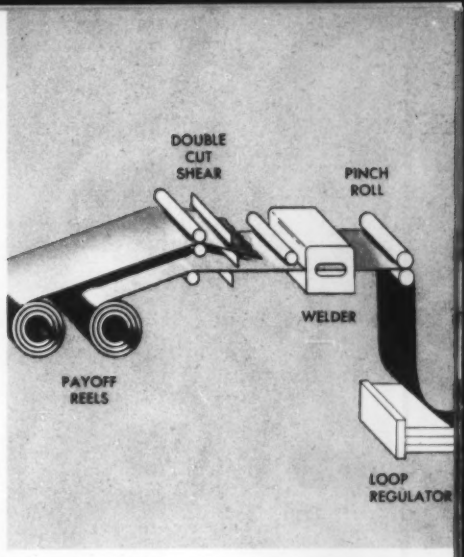
Magamp current regulator (CR) for booster and Magamp counter emf regulator (CEMFR) for motor work together to maintain regulated tension by the pay-off reels (POR) and winding reels (WR). Inertia compensation (IC), proportional to accelerating loads and stall tension signals, is introduced through the (CR) circuits.

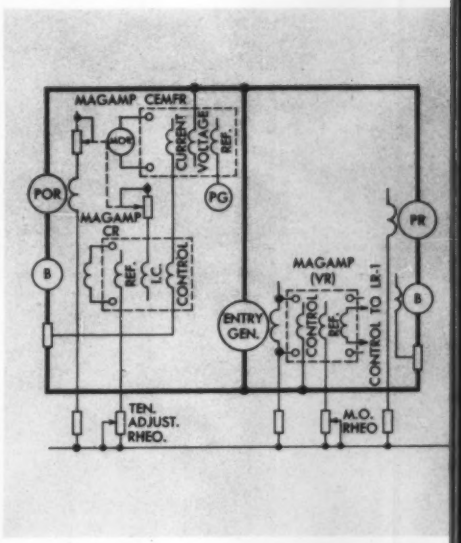
Photo-thyratron loop regulators (LR) provide modulated control of storage loops for smooth operation.

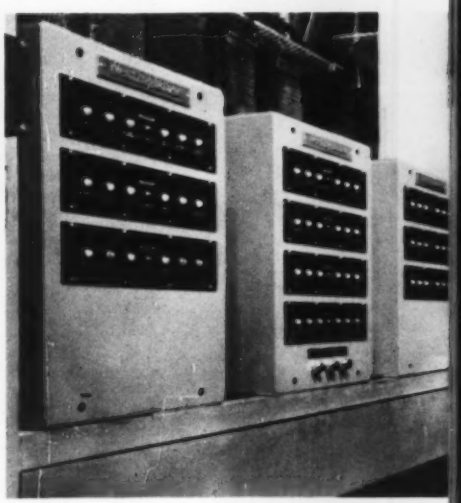
Electronic regulators control top and bottom plating current to deposit proper tin coating on each side at all line speeds.

Machine characteristics are selected for optimum drive performance. Entry section pinch roll (PR), master bridle roll (MBR), and drag bridle No. 2 (DB-2), the pace setters of their respective line sections, are shunt-wound for flat speed-load characteristics. Tank drives (T) have high drooping characteristics which result in their developing only the power required to overcome their friction losses and inertia loads. Reel motors have overload capacities suitable for accelerating the large coils now used in most mills.

*Trade-Mark.





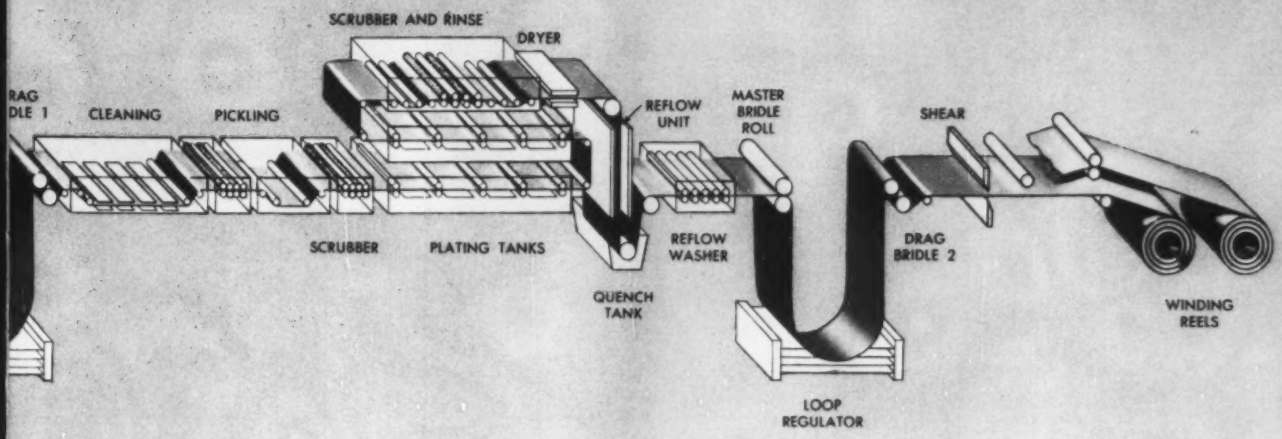


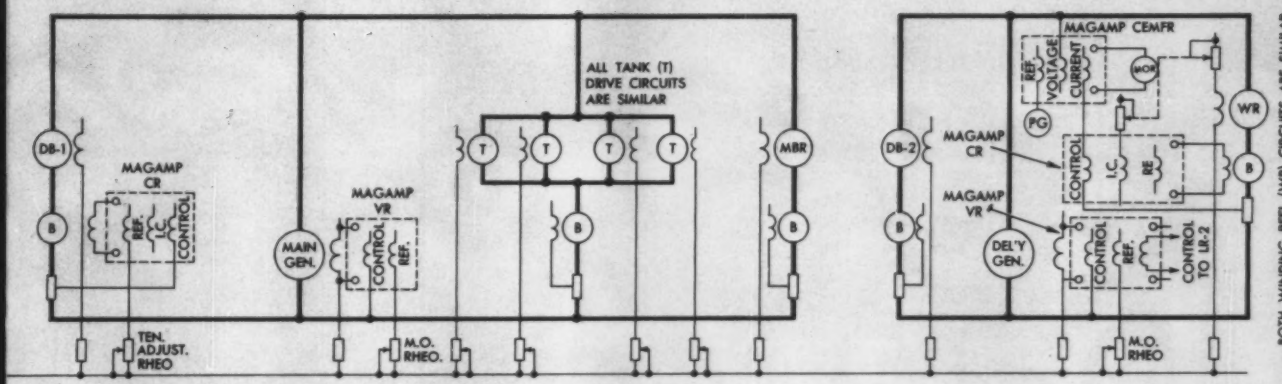
New Westinghouse fault finder monitors control circuits simultaneously, indicates system faults instantly . . . remembers them . . . makes trouble shooting easy.

YOU CAN BE SURE...IF IT'S

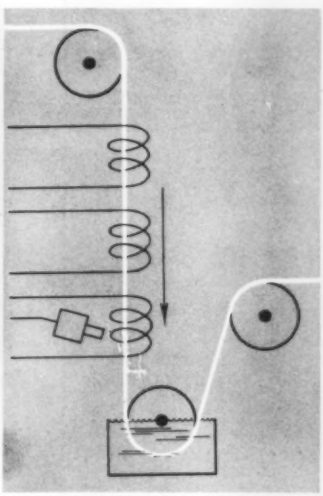
Westinghouse

ELECTROLYTIC TINNING LINE





Westinghouse 2400-kw oscillator equipment supplies high-frequency power to inductor coils. Generator output can be raised or reduced 90% in a couple of seconds.



Photoelectric scanner measures light reflection of passing strip, regulates radio-frequency power application in fraction of a second through saturable reactor.

WESTINGHOUSE EQUIPMENT SERVES THESE USERS

COMPANY	LOCATION	RATED LINE SPEED FPM	TIN FLOW EQUIPMENT
Jones & Laughlin Steel Corporation	Aliquippa, Pa.	600	600 kw, RF
Jones & Laughlin Steel Corporation	Aliquippa, Pa.	2100	1800 kw, RF
Republic Steel Corporation	Niles, Ohio	1000	1000 kw, RF
Republic Steel Corporation	Niles, Ohio	1400	1400 kw, RF
Steel Mill	California	1500	3000 kva, conduction†
Weirton Steel Company‡	Weirton, W. Va.	1300	1200 kw, RF
Weirton Steel Company	Weirton, W. Va.	1300	1200 kw, RF
Weirton Steel Company	Weirton, W. Va.	2100	2400 kw, RF
Weirton Steel Company	Weirton, W. Va.	2100	2400 kw, RF
Youngstown Sheet & Tube Company	Indiana Harbor, Ind.	600	600 kw, RF
Youngstown Sheet & Tube Company	Indiana Harbor, Ind.	2100	2400 kw, RF†

†Not yet in operation. ‡Division of National Steel Corporation.

Several other electrolytic tinning lines have Westinghouse conduction or radio-frequency reflow heating equipment, but line drives of another manufacture.

Westinghouse d-c motors withstand tough treatment because Bondite* and Bondar* insulations have twice the life expectancy of ordinary insulation. This means longer service from drive system, as well as the motors. *Trade-Mark

World's fastest tinning lines are Westinghouse-equipped

Engineering for electrolytic tinning lines is the most demanding in a steel plant, and Westinghouse pioneering in this field dates back to early attempts to deposit tin electrolytically on steel strip. Westinghouse has supplied all the electric line drive and tin reflow equipment for the higher speed horizontal acid type lines, and is now building equipment for the highest speed, vertical acid type.

The fastest tinning lines have as many as 150 individual d-c motor drives. Combining these drives, the generators that supply power to them, the 12 to 15 operators' stations, and the 100-foot-long controller into a coordinated drive system requires the kind of engineering and manufacturing talent Westinghouse can give you.

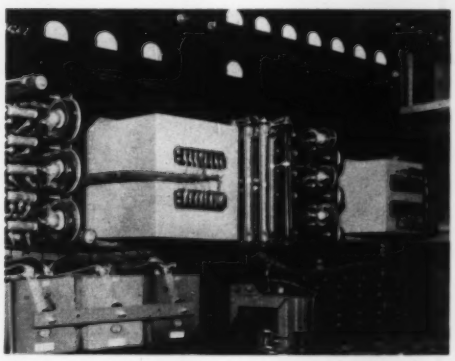
Reflow equipment, electro-cleaning and chemical treatment generators, switchgear, and numerous individual a-c motor drives and controls for pumps, scrubbers, welders and machinery adjustments must also be integrated into the system.

From planning to design, installation and start-up . . . Westinghouse brings decades of experience to you. A Westinghouse team will accept unit responsibility, and work with your engineering staff and consulting engineers in setting up your tinning line.

Contact your Westinghouse sales office for further details. Ask for a copy of B-6072, *Westinghouse Drives for Processing Lines.* Or write, Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

YOU CAN BE SURE...IF IT'S

Westinghouse



Magamp regulators have no moving parts, brushes, commutators, bearings . . . bring outstanding precision, dependability to line drive control.

Westinghouse large motor-generator sets are built with Thermalastic® insulation which provides 20% greater dielectric strength, 10 times greater voltage endurance, 30 times greater tensile strength than ordinary insulation.

MP-3047

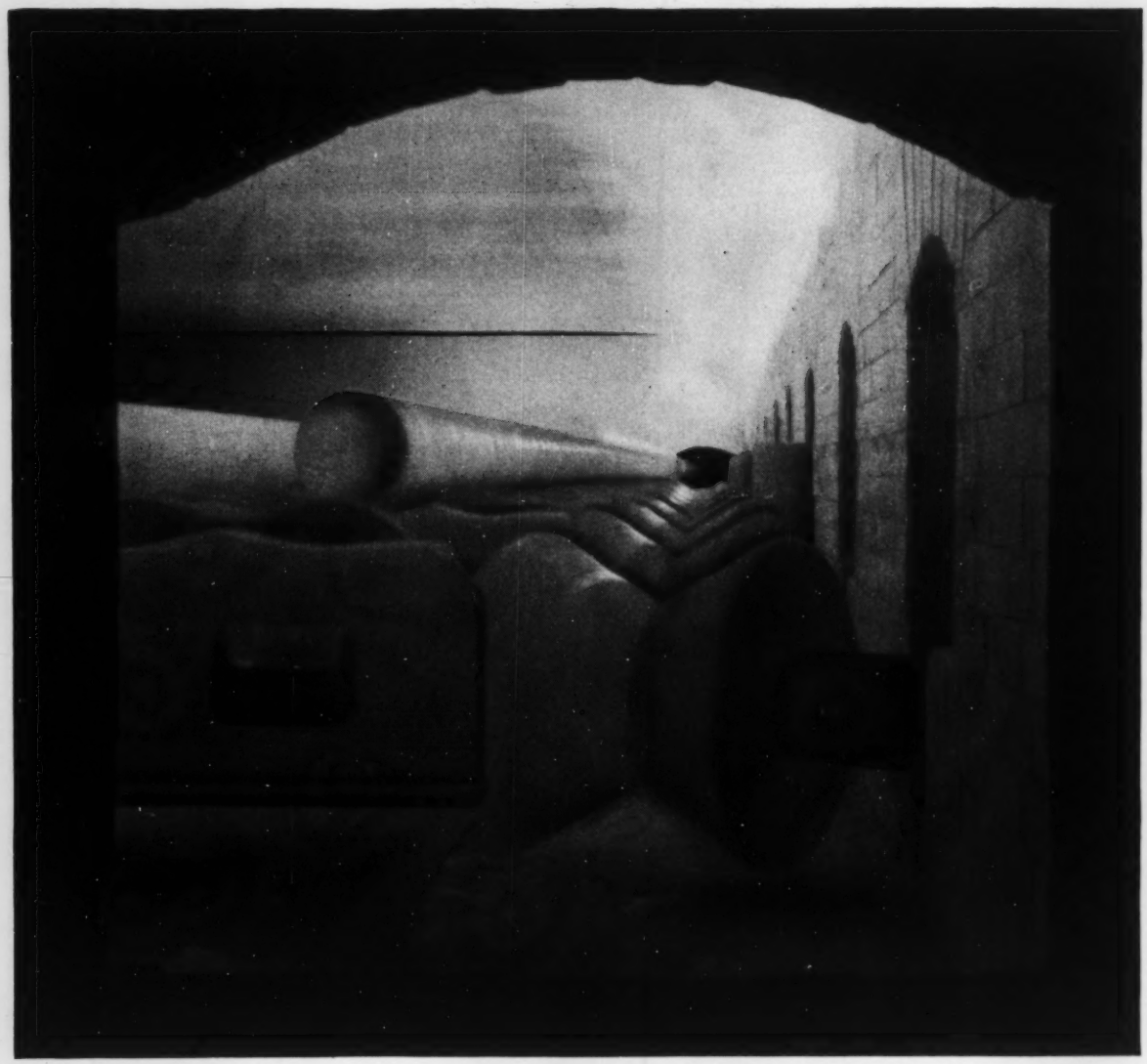
Tension . . . by the ton!

While the air-powered Signode stretcher holds the strapping at its one-ton tension, the workman crimps the seal with a Signode air-powered sealer. The seal, the strap—and the tension—will hold, to keep this 4900-pound bundle of steel bars tight and secure to destination. What material other than steel strapping could do this job, could take and hold this tension, would cost so little, could be applied with air power to do the hard work fast? This hefty bundle is a good example of how—and why—Signode can make your product cost less to handle, store, ship and receive. To be specific, call your Signode man, or write:

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

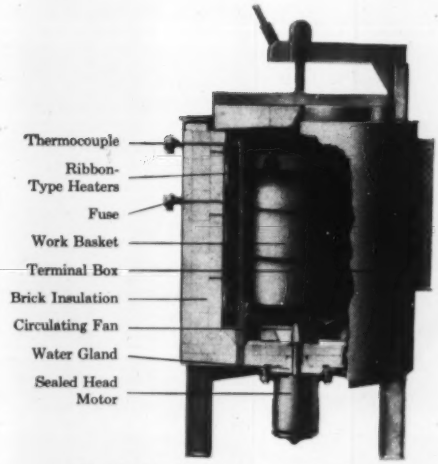


Interior of a high temperature, hearth type Gas furnace specially designed for heat treating high strength steel casing

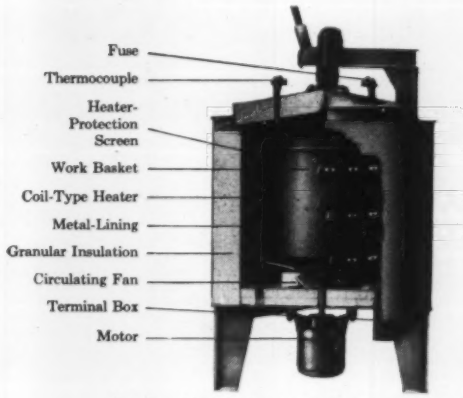
J&L speeds production, decreases costs . . . thanks to *GAS*

This Gas furnace at Jones & Laughlin Steel Corporation, Aliquippa Works, Pennsylvania, assures high strength characteristics formerly attained by adjusting the chemical composition of the steel. With Gas, J&L speeds production of special high strength seamless tubular products. Heat treating these products with Gas also saves tons of strategic materials like manganese, molybdenum and chromium, formerly used in the production of high strength seamless pipe.

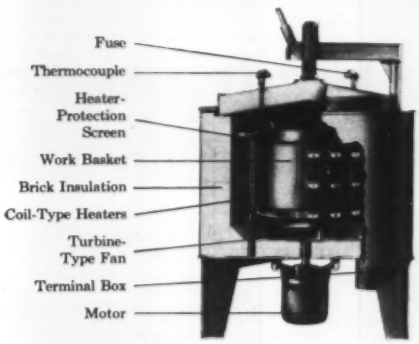
For information on how Gas can help you with your production problems, call your Gas Company's industrial specialist. He'll be glad to discuss with you the economies and outstanding results you get with Gas and modern Gas industrial equipment. *American Gas Association.*



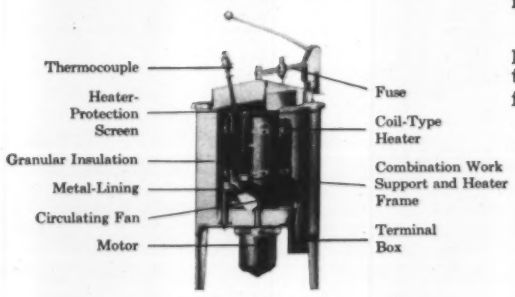
For Production Parts to 1650 F



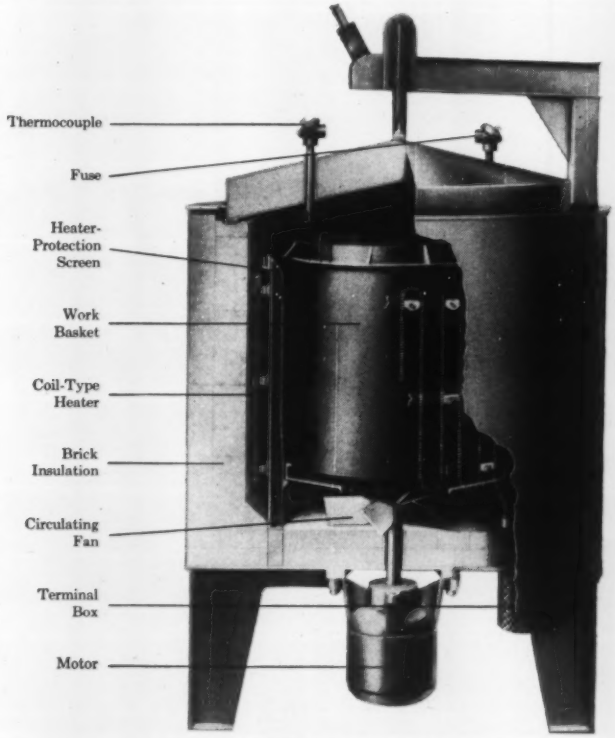
For Production Parts to 800 F



For Dense Load Production Parts to 800 or 1400 F



For Tools to 1200 F



For Production Parts to 1400 F

ONE OF THESE L&N HOMO FURNACES IS

Built for Your Job!

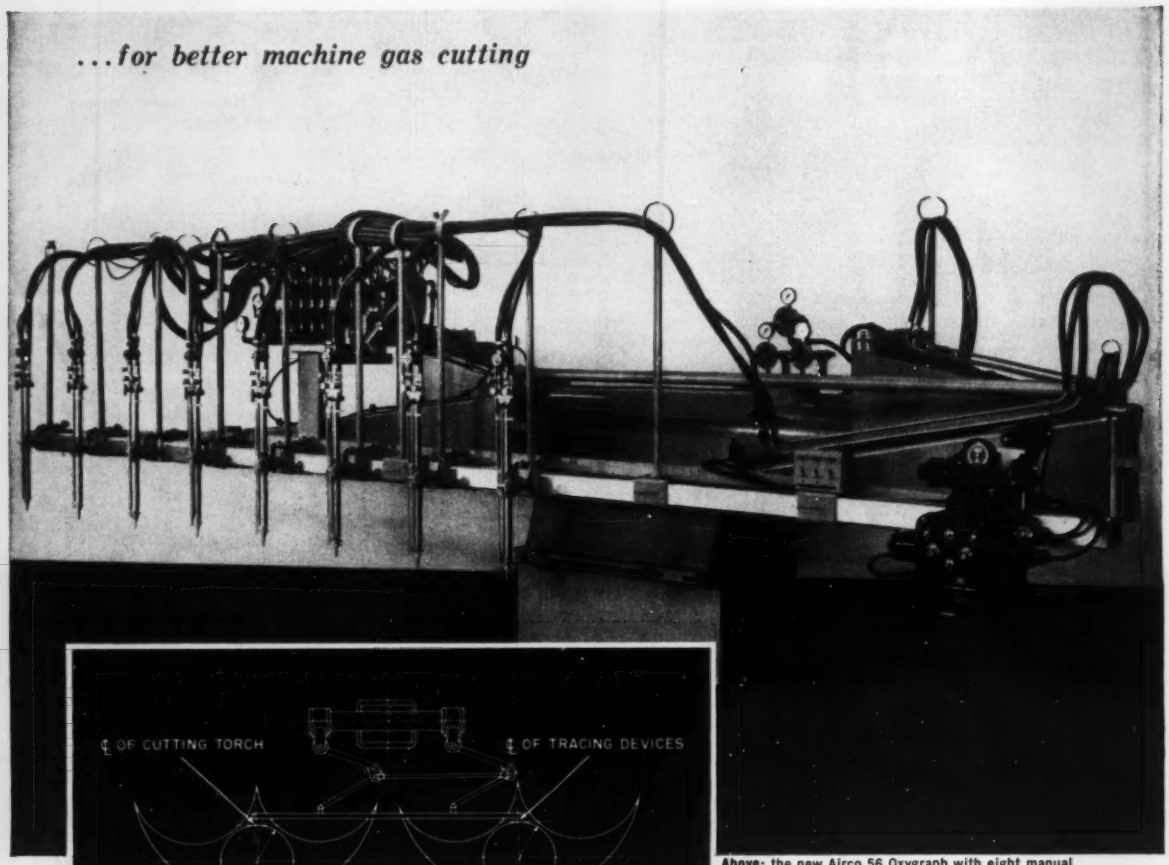
● Whether you temper steel, anneal glass or solution treat aluminum; whether temperatures are under or over 1000 F; whether loads are dense or open, there's a Homo furnace to handle the job. And it will give you fast heats . . . low cost production that meets quality control standards.

We'll be glad to help you investigate your potential savings. Just give us a brief description of your individual heat treating problem. We'll refer you to a plant using the Homo method for work like yours. Then you can see for yourself.

In the meantime, for more information about these completely "packaged" equipments just phone our nearest district office or write us at 4957 Stenton Ave., Phila. 44, Pa. for catalog TD4-625, "The Homo Method for Tempering".

LEEDS NORTHRUP
instruments *automatic controls • furnaces*

...for better machine gas cutting



Above: the new Airco 56 Oxygraph with eight manual torches. All-welded construction provides unusual sturdiness and durability.

At left: drawing shows great versatility in patterns that can be cut with the new model 56.

NEW...Airco 56 Oxygraph

...for better machine gas cutting of larger work on production schedules

This newly developed Airco 56 Oxygraph meets the demand for a multi-torch oxy-acetylene shape cutting machine that will handle substantially large areas. It *cuts* a *full 56" circle*, and corresponding square and rectangular shapes. Rugged box girder design is used for the pantograph arms, holding vibration to a minimum. Tracer response is smooth and friction-free as a result of large diameter ball bearings in the pantograph hinges and operating bar assembly.

This newest of Airco Oxygraphs will cut an unlimited variety of shapes from steel plates, slabs, billets and forgings. Flexibility of design allows amplifying scope of machine to meet increased shop demands. Tracers are available in four types: electronic, manual, magnetic and spindle. This widened capacity of the new model 56 marks another step forward in welding and cutting progress. For detailed information on the New 56 Oxygraph, write direct to Airco.

welding
AT THE FRONTIERS OF PROGRESS YOU'LL FIND...

AIRCO®

Offices and dealers in most principal cities

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated
150 East 42nd Street, New York 17, N. Y.

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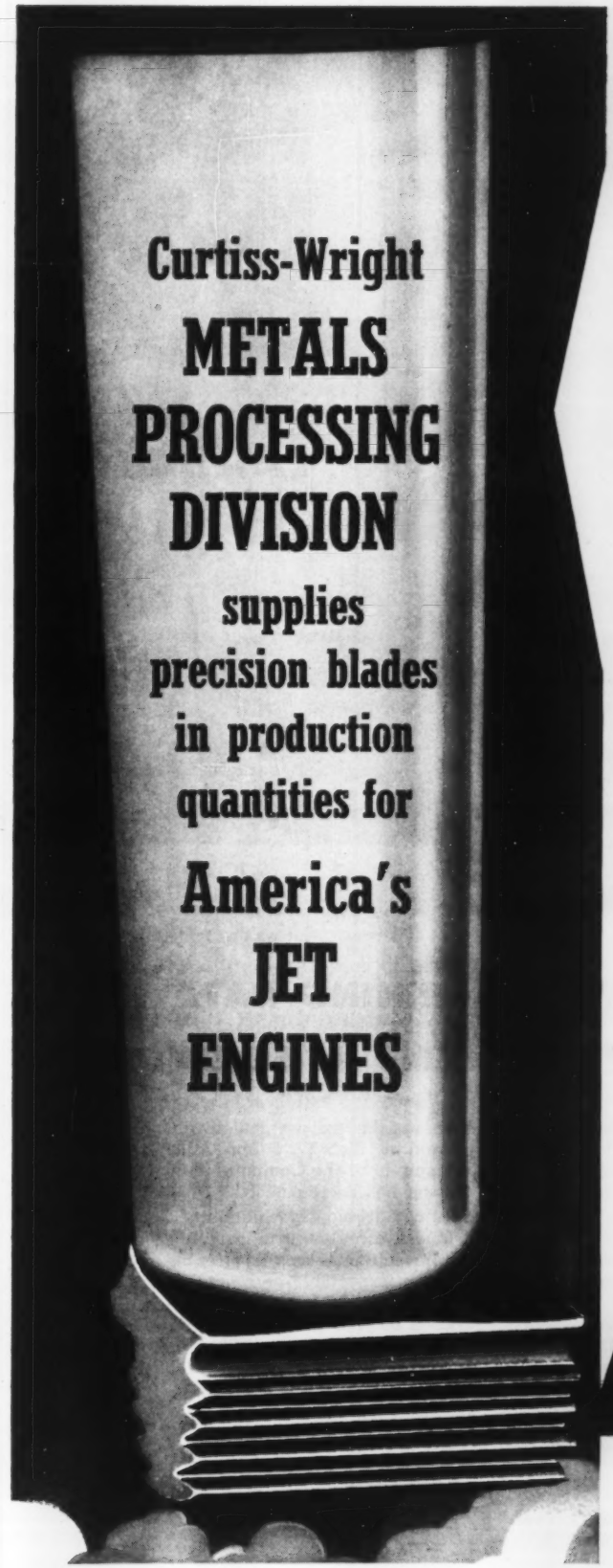
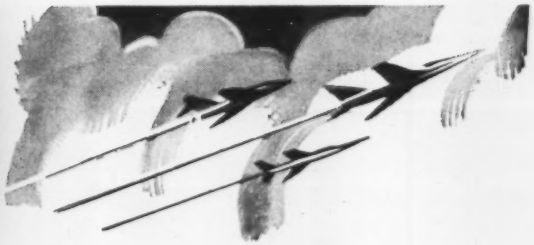
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols, and other synthetic resins.





FORGING

Air Superiority for National Defense

A complete prototype service for the design and production of jet engine blades is ready to work for you at the Metals Processing Division of Curtiss-Wright. One of the most experienced blade producers in the industry – now turning out thousands of blades daily – the Metals Processing Division can contribute importantly at any stage of your operation . . . from blueprint through prototype . . . from processing of pilot quantities to full volume production.

The Division's precision controlled production means more accurate development now . . . smoother production later. Coordinated facilities for casting, forging, grade rolling, machining and extrusion round out the picture. Write today for qualified engineering consultation, without obligation.

80 GRIDER STREET

METALS PROCESSING DIVISION

CURTISS-WRIGHT

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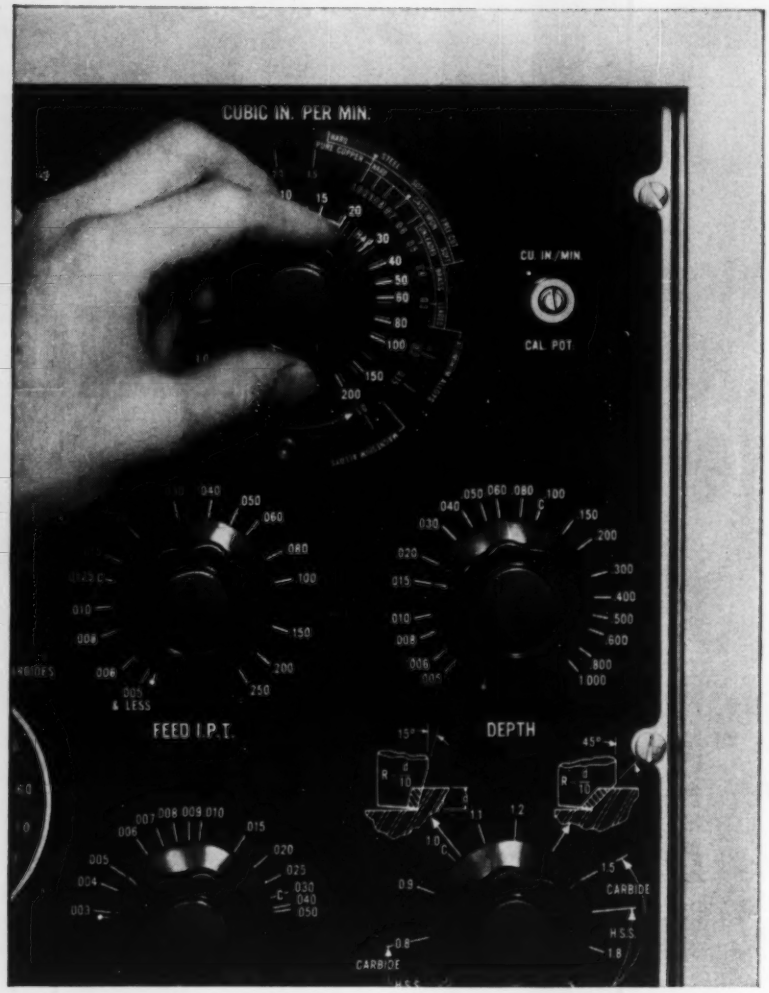
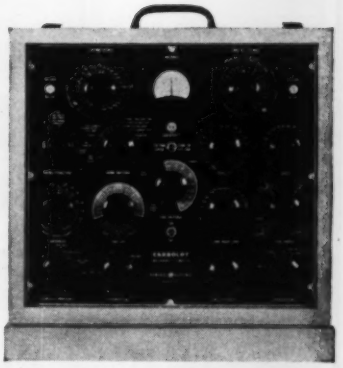




CARBOLOY.
MACHINABILITY COMPUTER

- Ends time-consuming tryout runs; saves valuable stock
- Shows you how to get maximum machine output at lowest cost

JUST DIAL IN KNOWN MACHINING DATA... SOLVE TOOL SETUP PROBLEMS IN SECONDS

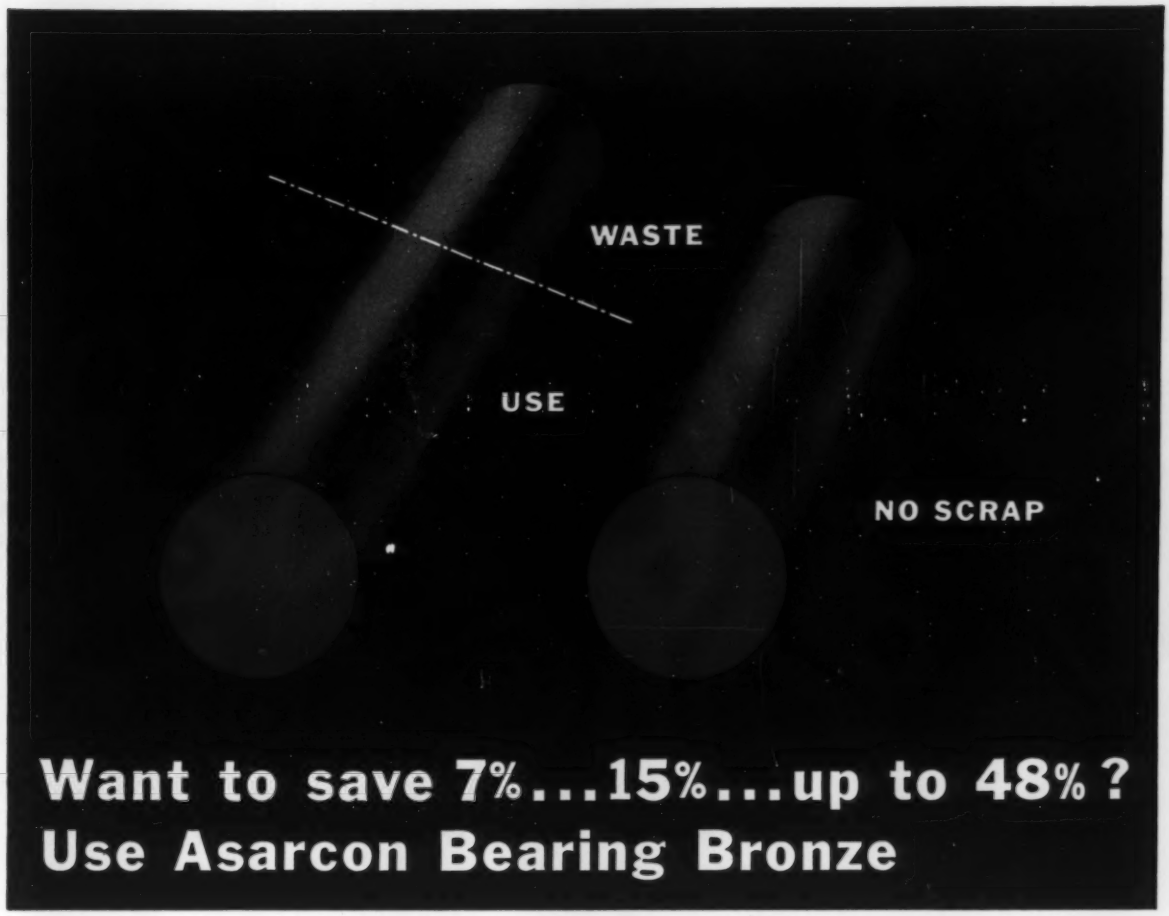
The Carboloy Machinability Computer accurately predicts how your tools and machines will perform on any job. Faster than any other method of figuring job setups, it calculates the effect of 19 basic machining variables on machine performance, tool life, and output.

With this information, you can check the accuracy of existing setups, determine new machining standards, eliminate costly pilot runs. With the Computer, you can quickly see how to vary operating conditions to gain maximum efficiency from the cutting tool, the machine, and the operator. Simply set up the known machining variables on the Computer dials . . . then adjust the unknown variable until the Computer shows that the correct setting has been reached.

Hundreds of Carboloy Machinability Computers are now in use throughout industry . . . on jobs ranging from initial setups to trouble-shooting. The Computer is portable and rugged; priced at $495 (f.o.b. Detroit). For more information, or a demonstration in your plant, write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Street, Detroit 32, Michigan.*

Progress Is Our Most Important Product

GENERAL ELECTRIC



Want to save 7%...15%...up to 48%? Use Asarcon Bearing Bronze

When you buy standard 13-inch bronze bars, you have a "remnant" problem.

A one-inch remnant on a 13-inch bar, is a 7.6 per cent loss; a two-inch remnant is a 15.3 per cent loss; and, if you bought a 13-inch bar when you needed only 6¾-inches, your loss could run as high as 48 per cent.

When you buy Asarcon 773 Continous-Cast bearing bronze, however, you can get the *exact* lengths you need, all the way up to 105-inches. You save on short-end scrap; moreover, you'll find that you're saving on diameter losses and machining time as well. For, with Asarcon 773 you order the *diameters* you want, up to 9-inches. The clean-up allowance for the size you specify is in the piece you get, and is less than the common ¼ inch on rough-cut bars; and Continous-Cast cored bars save you costly machining time plus the weight of the core metal.

Asarcon 773 (SAE 660) is stocked—in 260 sizes, solids and tubes – by a national network of conveniently located distributors. Talk to one of them, or write directly to us. We'll be glad to show you how other companies are turning short-end scrap losses into savings.

ASARCO

Continuous-Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana

WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal

A new line

RYK

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E.P.	0
RYKON Grease No. 1 E.P.	1
RYKON Grease No. 2 E.P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

of Standard Oil greases

ON GREASE

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a new non-soap, organic thickener.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce maintenance and grease handling problems.

RYKON Grease Properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability — Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable — Maintain consistency even under severe mechanical working.

Chemically stable — Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Oil separation — Minimum bleeding of oil in service and storage.

Wide temperature range — Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance — Do not lose consistency in presence of water. Resists water washout.

Anti-rusting — Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong grease or the use of an "economy" grease.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Special features for better production...

Versatile
ACIPCO
Centrifugally Spun
STEEL TUBES

New Cottrell five-color sheet-fed rotary letterpress for high speed production of fine quality boxboard printing. Photos courtesy of The Cottrell Company, Westerly, Rhode Island, a subsidiary of Harris-Seybold Company.

Cottrell rotary boxboard presses, built on the common impression principle, achieve remarkable color fidelity at speeds as high as 7000 sheets per hour. Available in 2, 3, 4, and 5-color models, they have many outstanding new features for better production.

The Cottrell spirally grooved plate cylinders in this high speed press were made from Acipco centrifugally spun steel tubes, "custom-made" for this application. Selected for strength combined with lightness, these tubes were furnished rough machined, 18⅞" OD, 13" ID, as cast, and 72¼" long.

Because of the intricate, accurate finish machining which was required, these tubes were furnished in Type 1045 steel. The inherently better machinability of Acipco tubes, plus their "built-in" qualities of dynamic balance and dimensional stability, helped Cottrell produce this better press.

If your steel tube application is a special one, and requires a combination of special qualities and properties, your investigation of versatile Acipco steel tubes will be worthwhile. A call to your nearest Acipco distributor will bring full information.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

are used in the manufacture of calender, engraving, press, slitter, rewinder, plate cylinder, squeeze and starch bath rolls, as well as in hundreds of other industrial applications.

SIZE RANGE: Lengths up to 16'— longer lengths by welding tubes together. OD's from 2.25" to 50"; wall thickness from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

DISTRIBUTORS

Austin-Hastings Co., Inc.
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Cambridge 42, Mass.

Peter A. Frasse and Co., Inc.
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4606 Singleton Blvd.
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285 Marietta St., N.W.
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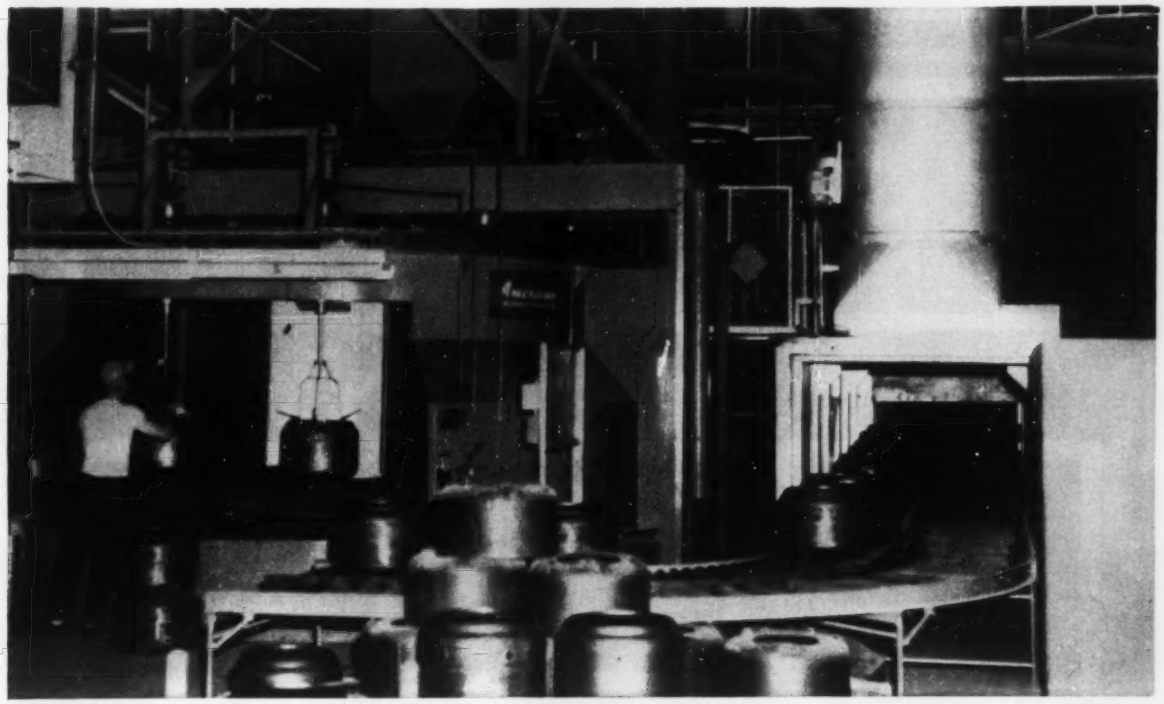


WHEELABRATOR® Provides 3-Fold Benefits for MAYTAG Porcelain Enameling

Expanded production has brought many innovations to Maytag porcelain enameling operations, including use of Wheelabrator airless abrasive blast cleaning equipment for surface preparation prior to enameling. In combination with burn-off facilities, Wheelabrating replaces pickling of certain components such as washer tubs.

According to Mr. Robert Thompson, Supt. of Maytag's Porcelain Enameling Department, Wheelabrator cleaning was installed because:

(1) It answered the need for increased capacity without expanding existing spray pickle machines;
(2) It eliminates the burr removal problem on spinner tubs while providing a satisfactory bonding surface;
(3) It is a step to provide for future installation of the one-coat white application process.

In the enameling of tubs, a burn-off station to remove oil and grease precedes Wheelabrator cleaning. This two-step operation replaces pickling. Approximately 210 tubs are cleaned hourly.

If cleaning steel is your problem or if you are now buying pickled and oiled stock at a premium, Wheelabrator blast cleaning offers tremendous profit possibilities. Write today for complete information on a Wheelabrator for your cleaning problem.

For more details on Wheelabrator cleaning of steel strip or sheet, send today for Bulletin No. 128-D.

WHEELABRATOR
CORPORATION

509 South Byrkit Street **Mishawaka, Indiana**

What kind of crane will assure you of peak performance and lowest cost? Whiting engineers know. For over 70 years Whiting has designed and built cranes for every industry. Whiting engineers have the imagination and experience to visualize new solutions to your materials handling problems. On the job, they closely supervise every phase of assembly and installation. They are always available for counsel and assistance—even after your crane has been in service for years. Get the full benefits of broad experience, practical imagination, thorough follow-through—call in a Whiting engineer at the "talking stage" of your new crane.

Write for Bulletin 80.

Read the story of "Whiting Engineered Cranes."

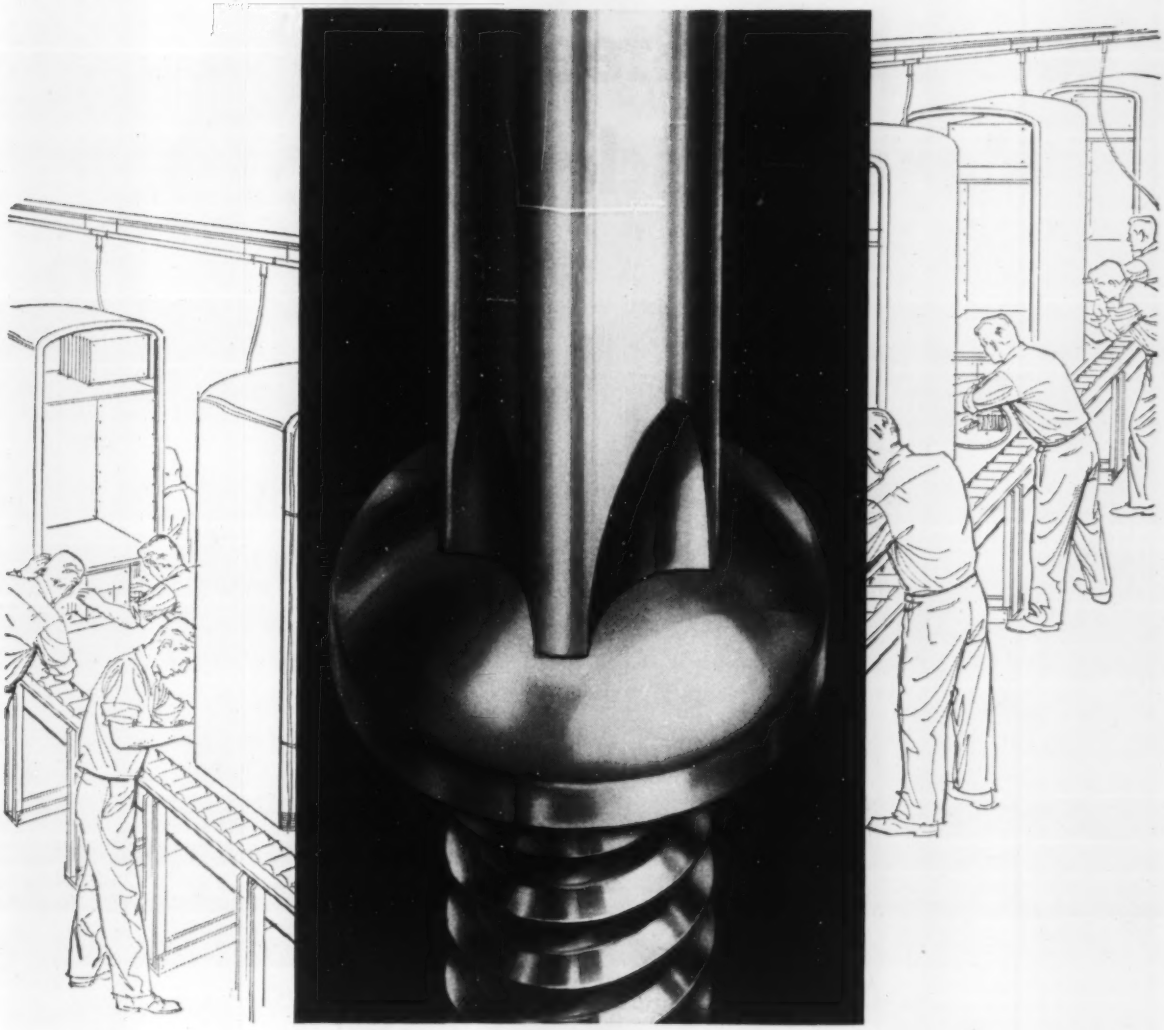
WHITING

Engineered CRANES

WHITING CORPORATION

15643 Lathrop Avenue, Harvey, Illinois

MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILE, FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT



They may appear the same, but . . .

AMERICAN is the name!

Four factors usually determine your actual fastening costs:

1. Price **3. Quality**
2. Service **4. Research**

Occasionally local price differentials may seem worthwhile, but no one gives you more of all four than American.

American Gives You More of All Four

In Service — where regardless of geographical location American is constantly meeting required delivery schedules.

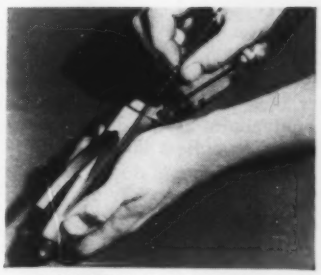
In Quality — that's a product of the machine, confirmed at the inspection table.

In Research — where American Engineers have not only developed the internationally accepted Phillips Head Fastener, but have created such exclusive products as SCREWSTICK for companies with unique fastening problems. SCREWSTICK enables power driving to replace the individual handling of small, tedious-to-manage screws resulting in cost savings exceeding 4 to 1.

You can use these same facilities to increase production, cut costs and boost quality, because no one gives you more of all four factors: *price*, *service*, *quality* and *research* than American.

Find out for yourself. Send us your inquiry for price and delivery or your specifications for special fasteners. Write:

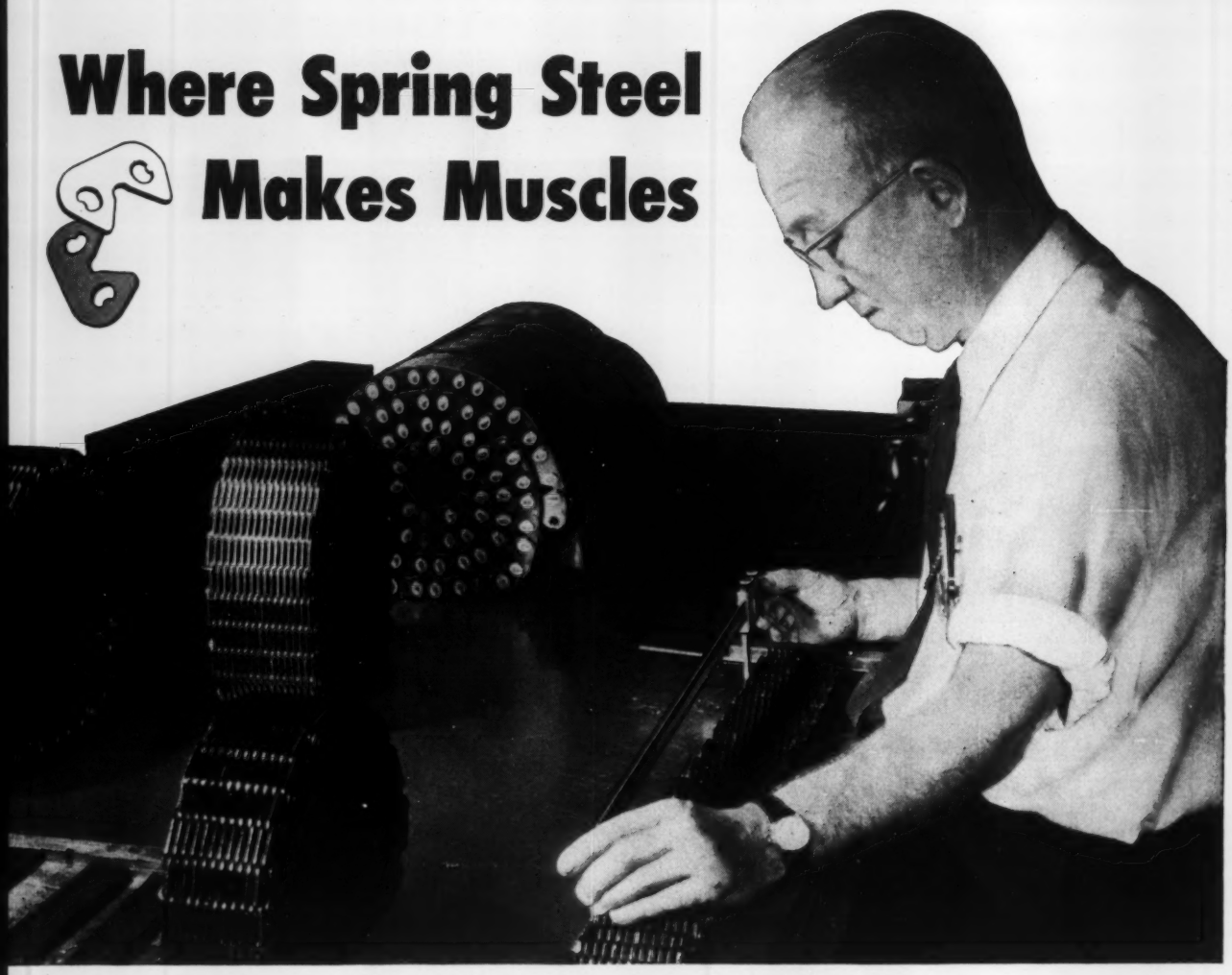
American!



SCREWSTICK being loaded into air-powered driver.

AMERICAN SCREW COMPANY
Willimantic, Connecticut
Norristown, Pa. • Chicago, Ill.
Detroit, Michigan

Where Spring Steel Makes Muscles



Uniform quality of steel from Thomas Strip Division, used for links on Morse Chain's rugged Hy-Vo power transmission drive, shows up as assembled chain is checked with a Vernier Gauge.

▶ Quality Thomas Strip Scores High As Links for Morse Chain's Rugged Hy-Vo

Because Morse Chain Company's Hy-Vo Chain transmits more power per inch of width than any conventional chain, it handles some of industry's toughest jobs.

And Hy-Vo can do its power transmission jobs at speeds up to 90 miles an hour.

There's a job in the oil fields, for example, that demands the kind of muscles Hy-Vo has—muscles that Pittsburgh Steel Company's Thomas Strip Division builds into Hy-Vo's durable links.

This tough oil field application requires a rugged four-inch wide power chain to transmit maximum horsepower to pumps operating at pressures up to 10,000 psi.

Thanks to precision engineering at Morse Chain and uniform quality steel, Hy-Vo takes this punishment in stride.

To make such a dependable, trouble-free power chain drive, Morse Chain—a division of Borg-Warner—buys the best steel made.

That's why tons of quality, cold rolled, high carbon spring steel strip from Thomas Strip are shipped each month to Morse Chain's Ithaca, N.Y., plant. Each coil must meet Morse Chain's demand for strip that has:

• **Punchability and Shearability** which show up on Morse high speed piercing and blanking presses making the chain links.

Uniform quality in the strip adds to the number of strokes possible before tools must be reground or sharpened.

Norman Bremer, chief engineer at Morse, underscored the importance of longer tool life when he declared:

"The more strokes we get between grinds, the lower our operating expenses."

• **Holding Tolerances** from shipment to shipment and from coil to coil. A foot length in any of the four sizes of the Hy-Vo can vary only from zero to plus 15 thousandths of an inch.

Even minute variations in thickness on each of the links that make up a width of Hy-Vo chain are enough to cause excessive stack-up in the assembly of the chain. Result: a rejected chain.

What's more, in a given length of Hy-Vo chain there are hundreds of links and many pins which require extremely close tolerances.

"Our experience with Thomas

(Advertisement)

Sample coils of Thomas Strip are taken to the Morse Metallurgical Lab for checks on chemical analysis.

Punchability and shearability qualities of Thomas Strip appear as coil is fed into a piercing and blanking press.

After links are blanked, tolerances on hole sizes are checked closely so that pins joining links will fit snugly.

Careful hand assembly of each Hy-Vo Chain follows after heat-treating and blackening of links. Fine grain cold rolled spring steel from Thomas Strip prevents undersize holes and excessive burrs.

Strip's ability to meet our rigid tolerance requirements has been very satisfactory," said Ted Sharp, Mr. Bremer's assistant. Just as it does in any application . . . including fasteners, springs or automotive parts. . . . Thomas cold rolled high carbon strip gives Morse these advantages:

• **Hardenability** that shows up during the rapid fire piercing and blanking operations. Too soft or too hard strip boosts the rejection rate and takes its toll of costly tools.

This is especially important because Hy-Vo Chain must meet an average ultimate tensile strength of 20,000 pounds per inch of pitch and width.

• **Uniformity in Micro-structure** adds to tool life and aids cleanliness in piercing and blanking links.

• **Standard Size Coils** of Thomas Strip's spring steel keep production humming and orders filled for Morse customers. Small size coils slow up the production pace because machines have to be stopped for each new coil.

If your product requires high carbon spring steel, you can duplicate the benefits Morse Chain Company gains through using Thomas Cold Rolled Strip. Whatever your needs for top quality steel strip specialties it will pay you to consider Thomas Strip. It's available plain or already coated with zinc, copper, brass, nickel, lead alloy or tin in a wide variety of finishes.

Get in touch today with Thomas Strip through any district sales office listed below. Trained engineering help is available to help solve your production problems. Call now.

Thomas Strip
DIVISION

Pittsburgh Steel Company

Grant Building **Pittsburgh 30, Pa.**

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

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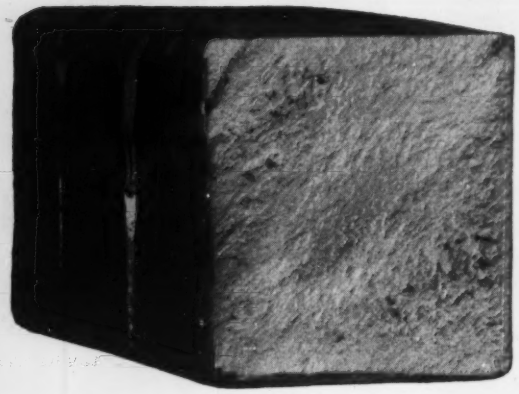


POROSITY

CAN'T HIDE BEHIND THIS SQUARE CUT

—WHEN YOU DIVIDE YOUR FORGING STOCK WITH A "BUFFALO" BILLET SHEAR

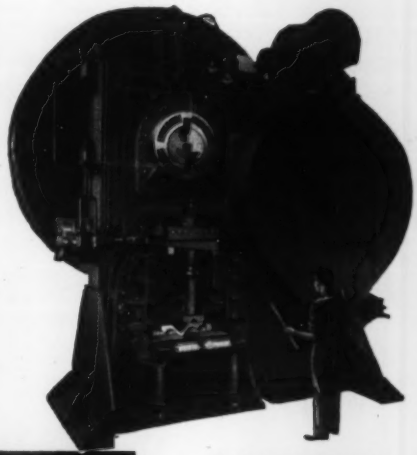
The time to detect porosity or "pipes" in your stock is *before* the forging, not afterwards, and that's one of many ways "Buffalo" Billet Shears save money.

The knives penetrate only $\frac{3}{16}$", localizing a sharp, vertical fracture — perfectly square, without the "smearing" present on sawed or burned faces. This enhances visual inspection and prevents many a forging "reject".

Other savings with "Buffalo" Billet Shears are high cutting speeds — elimination of gas and burner expense — maintenance of uniform weight in billets — and minimum operating cost over the years.

11 sizes are ready to meet your needs, the smallest handling 2¼" rounds or 2" squares at 30 strokes per minute — the largest handling 10" rounds or 9" squares at 6 strokes per minute. All have the "Q" Factor* of engineering and workmanship that provides trouble-free satisfaction and long life in every "Buffalo" product. Write for Bulletin 3295-C and see how these Quality features can save you money.

**The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*



540 PER HOUR!

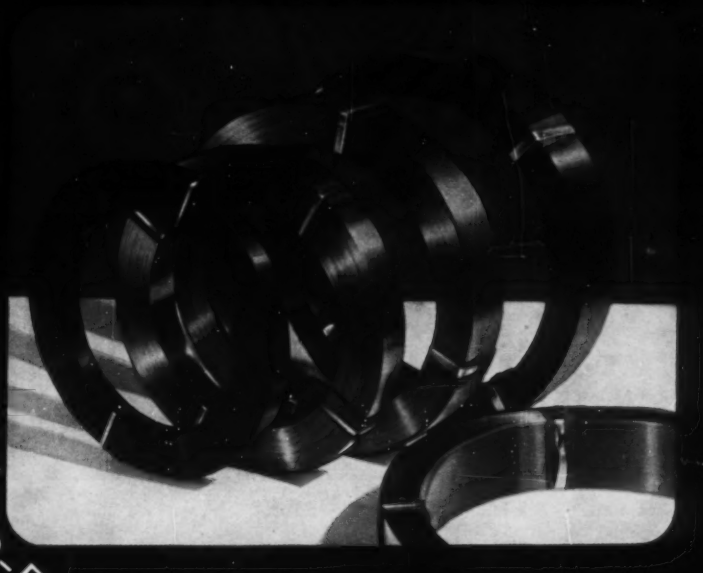
That's the output of a "Buffalo" No. 15 Billet Shear dividing 7" square stock in a large plant. Machine has automatic feed table and back gage. Above is a No. 17 Shear, largest in the line.

BUFFALO FORGE COMPANY

158 Mortimer Street • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING



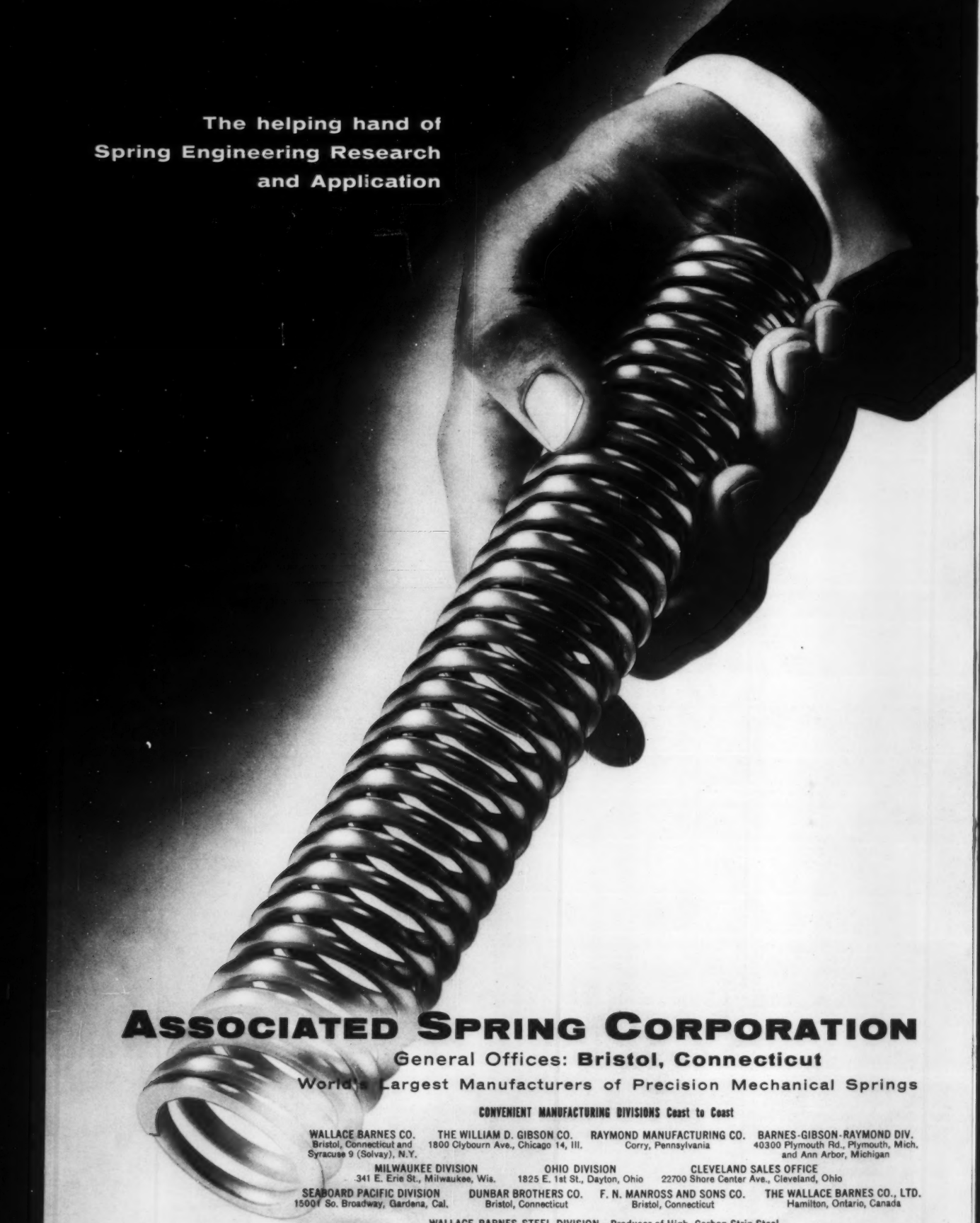
COLD-ROLLED SPRING STEELS

WALLACE BARNES STEEL DIVISION

ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

ALSO MAKERS OF SPRINGS — WIRE FORMS — SMALL STAMPINGS



ASSOCIATED SPRING CORPORATION

General Offices: **Bristol, Connecticut**

World's Largest Manufacturers of Precision Mechanical Springs

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WALLACE BARNES STEEL DIVISION – Producer of High-Carbon Strip Steel

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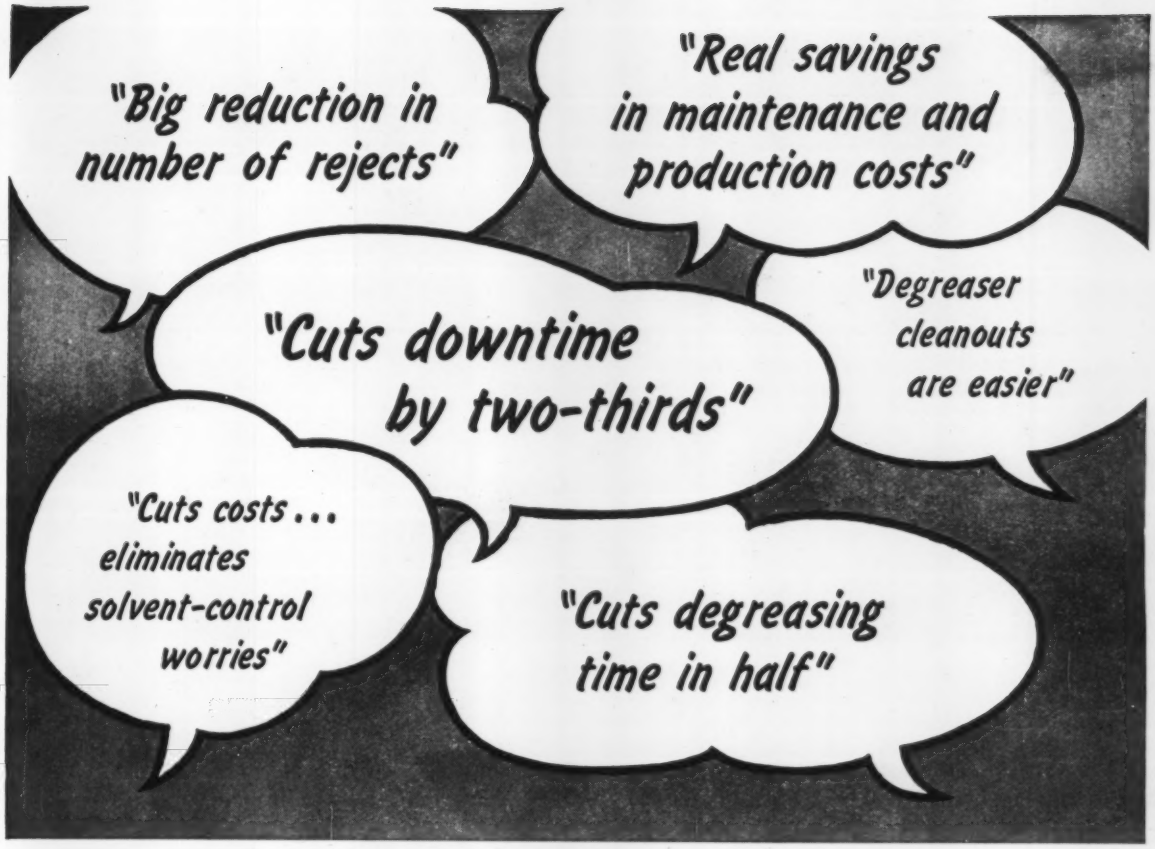

"Big reduction in number of rejects"
"Real savings in maintenance and production costs"
"Cuts downtime by two-thirds"
"Degreaser cleanouts are easier"
"Cuts costs... eliminates solvent-control worries"
"Cuts degreasing time in half"

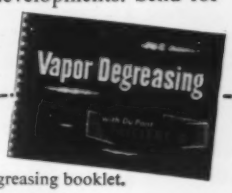
Here's why TRICLENE D is used for fast, thorough vapor degreasing

These statements represent the kind of degreasing results you can expect from "Triclene" D trichlorethylene. Manufacturers of products as different as automotive accessories, sporting goods, refrigerators, locks and builders' hardware—all users of "Triclene" D—made these comments.

They use it to clean grease and oil from all types of metals with every degree of surface polish. Users note that time between cleanouts is extended, and cleanouts are far easier. "Triclene" D maintains brighter cleaning—distillation after distillation—job after job.

Heat, light, air, acids and aluminum chloride will not affect "Triclene" D with its locked-in stabilizers. "Triclene" D trichlorethylene retains its original purity longer—contains nothing to harm even the most carefully machined surfaces. Yet it costs no more than other degreasing solvents!

Get all the facts on vapor degreasing. Du Pont's new book contains forty-two pages of data and illustrations on the latest metal-cleaning developments. Send for your copy—without obligation—today.



TRICLENE® D
TRICHLORETHYLENE

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department S-4
Wilmington 98, Delaware

☐ Please send me a copy of your new vapor-degreasing booklet.
☐ Please have your Representative phone for an appointment.

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____

Better flavor, better health in every bite . . . thanks, in part, to Monel.

What does this new sea salt have that you need?

Here is a new type of salt . . .

Three-quarters of it is sodium chloride — common salt. The other quarter consists of a natural mixture containing so-called "trace elements" — tiny amounts of copper and cobalt and magnesium . . . zinc . . . molybdenum . . . manganese . . . calcium . . . and other elements and minerals.

Experts believe that these trace elements may hold the key to many health problems. And with reason. Hasn't iodine been used to prevent goiter? Fluorine to stop tooth decay? Iron to overcome anemia?

Hence a spanking new plant—35 miles south of Corpus Christi, Texas — to produce *Admiral* Sea Salt from Baffin Bay, where the water is almost twice as salty as average sea water. Of course, the high salt content is an advantage from a manufacturing standpoint. But from the angle of plant designing — !

Engineers faced two potentially serious corrosion problems. Attack on *inside* surfaces of equipment by this extra-salty water . . . and attack on *outside* surfaces by salt-laden breezes.

Use of Monel* nickel-copper alloy in the more critical pieces of plant equipment avoids both hazards. Monel alloy is one of a family of Inco Nickel Alloys noted for corrosion resistance. Widely used in chemical, petroleum, marine and other industries where acids or alkalies are frequent troublemakers, Monel provides a ready solution to many common problems.

Do you have a problem in which corrosion is a major factor? Or wear? Or high temperatures? Or some destructive *combination* of conditions? Then send for our guide to the many useful properties and widespread applications of the Inco Nickel Alloys. It's called "Standard Alloys for Special Problems."

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INCO TRADE MARK

INTERNATIONAL NICKEL
Nickel Alloys Perform Better, Longer

Metalworking Outlook

Pay Boosts for 1.4 Million

About 1.4 million U.S. workers will get cost-of-living boosts in pay of 1 to 3 cents per hour, following the record set by the Consumer Price Index—it's up to 118.9 per cent of the 1947-1949 average. Weekly earnings of factory workers after taxes dropped slightly in March from what they were in February, says the Bureau of Labor Statistics. For the first time in two and a half years, real earnings failed to show a gain over year-ago marks. For a worker with three dependents, they dropped to 121.5 per cent of the 1947-1949 average from 121.9 per cent in March, 1956.

Fence Mending in Steel Union

United Steelworker President David J. McDonald has some fence-mending to do. Final and official results of the February presidential election show that he polled only 404,172 votes. His opponent, the virtually unknown Donald C. Rarick, won 223,516. Mr. McDonald is still in office, of course, but he and his colleagues had predicted he would poll 85 to 90 per cent of the vote. His share turned out to be less than 65 per cent. We'll be hearing more about Mr. Rarick.

Prospects Good for Tools

Look for machine tool shipments to reach about $900 million this year, compared with $886.2 million in 1956. Net new orders should hit about $750 million, compared with $924 million in 1956. Backlogs are dropping, but at the end of the first quarter still stood at a healthy 5.5 months. First quarter new orders reached $181.5 million, compared with $187.6 million for the last quarter. Shipments in January, February and March this year totaled $244.1 million, compared with $193.4 million in the same months of 1956.

Alco Opens the Package

Five months ahead of schedule, Alco Products Inc., the U.S. Army Corps of Engineers and the Atomic Energy Commission today (Apr. 29) unveil the Army Package Power Reactor (APPR) at Ft. Belvoir, Va. It starts a 700-hour period of continuous operation. The reactor promises to be the first in a long line of similar small power plants. Costing $3.5 million, it uses the pressurized water principle to produce 2035 kw of electricity. Alco is ready to build variations of the APPR for somewhere in the range of $600 per kilowatt, says Kenneth Kasschau, director of its Atomic Energy Division.

More Iron Powder

Watch for continued expansion in iron powder shipments. A record 32,500 tons were shipped last year, compared with 2000 tons in 1946, reports the Metal Powder Association. Almost 70 per cent of iron powder consumed in the U.S. is also manufactured here. In 1954, nearly one-half was

Technical Outlook—p. 163 Market Outlook—p. 231

imported, principally from Sweden. But the capacity to produce iron powder in this country is more than twice the market for it. Last year, domestic producers sold less than 23,000 tons but could have produced 48,500.

Another Chance for Tungsten

Western mining state senators are sure they still have a chance to get money to stockpile tungsten. They'll try to tack an amendment for about $8.5 million onto an upcoming deficiency appropriations bill or onto the Interior department's fiscal 1958 budget. The House, however, shows little sign of co-operating. The White House has promised Interior a full scale minerals program before the year is over. With developing defense needs for tungsten, there might be stockpiling money in that, too.

Set-Asides Again

The government set aside $506.8 million worth of contracts for small business in the first nine months of fiscal 1957, compared with $299.6 million in the same period of fiscal 1956. March set-asides were $66.8 million, up $27.2 million from March, 1956.

Fight for BDSA

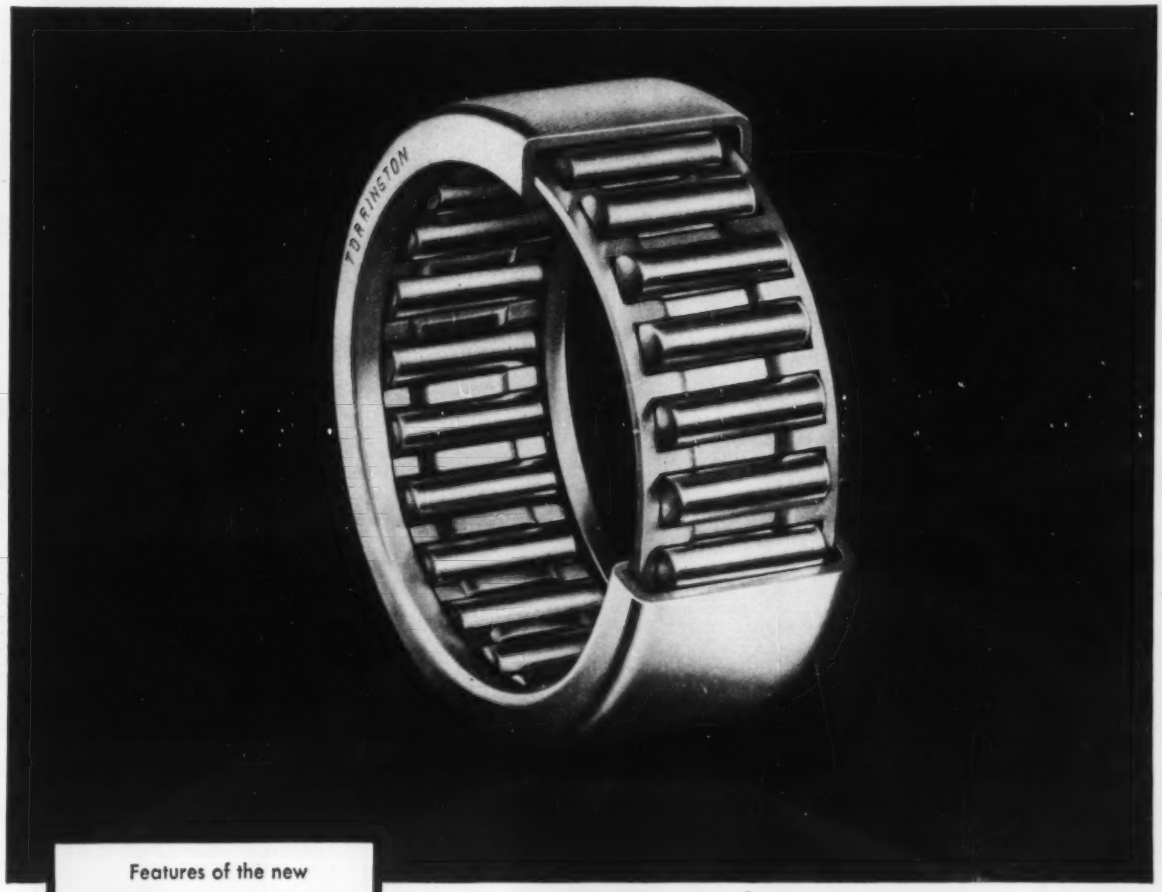
The National Tool & Die Manufacturers Association wired the Senate Appropriations Committee on the proposed cut in Business & Defense Services Administration's funds (STEEL, Apr. 22, p. 51): "All our members are small businessmen and badly need this helpful point of contact with the federal government." BDSA officials report other industry groups are sending similar messages. Committee hearings resume this week. Outlook: A compromise between the House's cut of $3.6 million and the administration's pressure to restore the funds.

Tankers Lead the Way

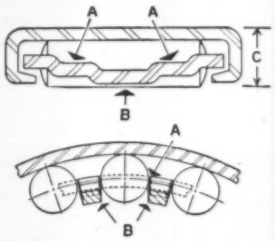
America's ocean-going merchant fleet had 1147 vessels of 1000 gross tons and over in active service on Apr. 1, up 27 from Mar. 1. Some 102 ships are under construction, including 93 tankers; some 16 ships are being converted, including 14 tankers. Total cost of that work is estimated at $1.3 billion. Says Maritime Administrator Clarence G. Morse: "Nearly 300 freighters and combination ships must be built during the next 10 to 15 years to replace units."

Straws in the Wind

Ford will initiate a large tool and die program in August; the company plans to buy about 3500 dies for 1959 model tooling . . . Ernest T. Weir remains as National Steel Corp. chairman but will pass along his duties as chief executive officer to Thomas E. Millsop, president . . . Union Oil Co. of California and Oil Shale Corp. will soon begin commercial size plants to produce oil from shale beds.



Features of the new
TORRINGTON DRAWN CUP ROLLER BEARING



- rollers end-guided at pitch line (A)
- shaft-riding retainer (B) designed to permit lubricant circulation
- high capacity in small cross section (C)
- long pregreased life
- efficient at high speeds
- mounted by press fit
- simple housing design
- low unit cost

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For the first time, the advantages of drawn cup outer race construction are available in a precision roller bearing.

This compact, lightweight bearing consists of spherical end needle rollers, a one-piece hardened steel retainer and case-hardened thin-section outer race. Designed to run on a hardened shaft or with an inner race, this new series takes a press fit in a simple housing without snap-rings or shoulders.

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These features make the new bearing particularly suited to applications requiring compactness with precision, high-speed endurance or long pregreased life.

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Let's Change Bulletin F

During the next two months, you have an opportunity to help industry (and your own company) save tax dollars today that will be needed tomorrow for the replacement and modernization of production facilities.

You can do so by sending your recommendations to a special committee of the U.S. Treasury's Internal Revenue Service which is studying ways to provide relief from its outmoded Bulletin F. The deadline is June 30.

The bulletin sets up a schedule for the depreciation of plant and equipment.

The government's depreciation policies date back to the early 1930s when it needed more revenue. By stretching out the alleged useful lives of plant and equipment over 20 to 25 years, Washington found that annual corporation profits subject to taxes could be arbitrarily inflated.

Over the years there have been a few changes in the laws governing depreciation allowances. Bulletin F was revised slightly in 1942. The Internal Revenue Act of 1954 provided optional ways to compute depreciation—the double declining balance method and the sum-of-the-years digits method.

Changes have resulted in some relief. But the Internal Revenue Service still is pretty much plagued by the necessity of following the narrow policy that facilities cannot be written off until they are worn out. To make matters worse, the application of depreciation schedules often varies from one IRS district to another, and depreciation schedules have not been spelled out for some new types of equipment.

We are in an era of terrific technological change. President Jerome A. Raterman of the National Machine Tool Builders Association calls it one of galloping obsolescence. No longer can we judge the life of equipment by the length of time it will hold together. It can become obsolete and economically useless in a few years. In effect, equipment is tending to become a direct production cost rather than a long-term capital investment.

This makes it all the more important that government tax collectors take a realistic approach to the problem of depreciation and obsolescence if industry is to remain strong and healthy.

The builders of equipment already are working with the IRS on constructive improvements in the administration of revenue laws. Also needed is the strong backing of users of equipment.

We suggest that you direct your recommendations and opinions to Commissioner Russell C. Harrington, Internal Revenue Service, Washington 25, D. C.

Irwin H. Such

EDITOR-IN-CHIEF

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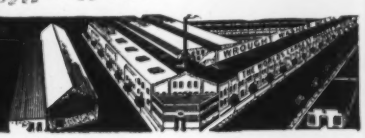

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Metalworking's 1st Quarter Earnings High, But . . . Some Firms Lag Behind '56. Industry Sees Good Year

Selected Manufacturers (First quarter net profits)

	1957	1956		1957	1956
Aluminum Co. of America	$18,594,086	$24,287,262	General Electric Co.	$64,006,000	$54,962,000
American Cyanamid Co.	13,000,000	12,302,000	M. A. Hanna Co.	3,118,000	2,743,000
Avco Mfg. Co.	3,119,876	665,300	International Business Machines Corp.	18,745,607	14,908,325
Binks Mfg. Co.	122,280	106,217	Monarch Machine Tool Co.	354,014	222,262
Blaw-Knox Co.	2,066,000	1,420,000	Phelps Dodge Corp.	15,200,000	25,000,000
Bullard Co.	150,000	353,297	Pittsburgh Coke & Chemical Co.	908,000	834,000
Calumet & Hecla Inc.	635,771	1,331,533	Pittsburgh Forgings Co.	551,088	362,323
Caterpillar Tractor Co.	14,614,844	11,647,054	Rockwell Spring & Axle Co.	4,505,566	3,984,824
Chance Vought Aircraft Inc.	1,010,232	749,293	Schick Inc.	705,195	424,830
Cleveland-Cliffs Iron Co.	870,993	1,164,477	Smith-Corona Inc.	500,000	389,794
Douglas Aircraft Co. Inc.	8,772,755	5,113,306	Texas Instruments Inc.	790,000	540,000
Eaton Mfg. Co.	3,055,232	3,760,770	Thew Shovel Co.	415,000	687,000
Fairbanks, Morse & Co.	660,507	200,271	Union Carbide & Carbon Corp.	35,454,638	37,673,547
Ford Motor Co.	100,500,000	73,700,000	Vertol Aircraft Corp.	733,721	624,432
General Cable Corp.	3,013,047	2,188,621	Westinghouse Air Brake Co.	3,170,224	2,532,698

Selected Steelmakers (First quarter net profits)

	1957	1956		1957	1956
Republic Steel Corp.	$28,052,826	$25,041,392	Crucible Steel Co. of America	$3,372,606	$3,680,966
Inland Steel Co.	14,613,704	14,015,549	Lukens Steel Co.	3,365,498	1,361,641
National Steel Corp.	13,501,506	14,102,586	Lone Star Steel Co.	3,288,951	2,243,867
Youngstown Sheet & Tube Co.	10,607,267	10,193,856	McLouth Steel Corp.	3,111,285	2,084,702
Jones & Laughlin Steel Corp.	12,823,000	13,559,000	Barium Steel Corp.	2,058,055	1,468,957
Kaiser Steel Corp.	7,784,118	4,127,592	Pittsburgh Steel Co.	2,011,260	2,469,624
Allegheny Ludlum Steel Corp.	4,790,665	4,572,608	Continental Steel Corp.	662,262	728,643
Wheeling Steel Corp.	4,559,000	5,280,000	Alan Wood Steel Co.	628,752	689,172
Colorado Fuel & Iron Corp.	4,552,392	4,016,414	Washington Steel Corp.	615,947	447,999

METALWORKING'S profits may reach an all-time high in 1957 if producers can keep earnings in step with sales. The proof: Most metalworking companies report first quarter earnings are higher than they were a year ago. The outlook for the other three quarters is equally bright.

Despite the glow of optimism, the profit picture isn't as rosy as it was at this time last year. Smaller first quarter profits are reported by 27 per cent of the manufacturers and 39 per cent of the steelmakers listed above. Reasons: 1. Less profit per dollar of sales. 2. Special problems.

Less for More — Some firms' profits declined in spite of larger sales. These companies have a tiger by the tail. They're absorbing higher labor and material costs without a proportionate raising of prices.

Traditionally, metalworking pulls in less profit per sales dollar than other industries. In 1955, for example, only nonferrous metals and steel made the top ten manufactur-

ing industries in profits on sales. That year, nonferrous profits stood at 9.5 per cent and steel at 7.8 per cent. The leader (cement) had a healthy 16.5 per cent.

On the brighter side, most firms showing a profit rise over the first quarter of last year are holding or increasing their percentage of profit per sales dollar. Only a few are lower.

Earlier this month, the National Industrial Conference Board surveyed 245 companies on their expected profit margins in 1957. They found most firms expect to hold to last year's position or perhaps improve upon it.

Special Problems — Some companies have individual reasons for a temporary dip in profits (which may or may not be compounded by the cost-price squeeze). Howard S. Runn, executive vice president, Union Carbide & Carbon Corp., cites higher research and development expenses and strikes at the company's oxygen producing facilities as factors in the profit dip.

John C. Virden, president of Eaton Mfg. Co. says the first quarter drop was entirely due to a strike which cut off production of heavy-duty truck axles during a normally busy period.

A decline in auto industry sales has affected the earnings of some steel firms. Crucible Steel Co. of America says the present fall in demand for its products is dominated by the drop in automotive steel buying which last year accounted for about 17 per cent of shipments.

Although a first quarter earnings statement for Armco Steel Corp. has not been released, preliminary estimates show a slight decline. Reasons: Less profitable product mix caused by the decline in sales of steel to the auto and appliance industries and high prices paid for scrap used during the first quarter.

Jones & Laughlin Steel Corp. says first quarter dips reflect the large expenses incurred in altering, relocating, and dismantling plant facilities in connection with its cost reduction and expansion program.

Gains—Two areas in which the profit situation is particularly bright are the aircraft and electrical industries. They show substantial increases over last year. Examples: Douglas Aircraft Co. is up $3.5 million in the first quarter and anticipates the other quarters will be as good or better. Chance Vought Aircraft Inc., and Vertol Aircraft Corp., also up, are equally optimistic.

Two giants in the electrical field, General Electric Corp. and International Business Machines Corp., had large profit jumps over 1956's (see table on page 121).

GE's president, Ralph B. Cordiner, reports gains in heavy electrical apparatus, consumer goods, electronics products and defense equipment.

Dips—On the minus side of the ledger, aluminum and copper generally showed first quarter declines.

Aluminum Co. of America and Reynolds Metals Co. cite customer reduction of inventories as a major reason in the aluminum falloff. The market should pick up in the months ahead, predicts R. S. Reynolds Jr., president of Reynolds. He looks for 1957 earnings to pass 1956's.

Copper is probably the hardest hit metalworking industry. Two examples: Phelps Dodge Corp. is down $10.6 million; Calumet & Hecla Inc. is down over $600,000 (a dropoff of nearly 50 per cent).

"The drastic fall in the price of copper from 46 cents a pound in July, 1956, to the current 32 cents is the main cause for the dip in income," reports Calumet & Hecla's president, Endicott R. Lovell. Mr. Lovell predicts earnings for the rest of the year will improve, "although I question whether results will match those for 1956."

Preview—Manufacturers are optimistic about the second quarter. General Steel Castings Corp.'s president, Charles P. Whitehead, says orders for industrial castings are going up (principally for the electric power and power shovel industries), partially offsetting a reduction in railroad orders.

Midland Steel Products Co., up from last year, expects second quarter earnings to be on a par with the first quarter's. A continuation of the present level of activity would put sales and earnings close to the 1955 pace when the company's auto chassis operations reflected record auto industry output and sales, Wade N. Harris, president, says.

Steel is equally optimistic. Alan Wood Steel Co. predicts a second quarter upswing in its operations on the basis of new orders.

Pittsburgh Steel Co. expects to hit capacity production during the second quarter. Brightest spot: Improvement in wire and wire product sales which have been lagging.

Kaiser Steel Corp., up over $3 million from last year, sees operations continuing at or near capacity in the second quarter.

One company's prediction: Look for industry to work down large steel inventories during the early weeks of the second quarter, then follow with an upsurge in orders.

Record Year?—How will 1957 earnings stack up? Consensus: As good or better than 1956's, most manufacturers and steelmakers think.

Westinghouse Air Brake Co. believes sales and earnings will show an increase over 1956's. Sales of regular products are expected to gain this year, and defense business should go up, reports President A. King McCord.

Col. W. F. Rockwell, chairman of Rockwell Spring & Axle Co., predicts his company's sales for the year will run about 13 per cent above 1956's. This would make 1957 Rockwell's biggest volume year since its formation in 1953.

With the best first quarter profits in its history, Republic Steel Corp. expects to earn more in 1957 than it did in 1956. "We anticipate operating rates will decline during the summer lull but will pick up again in the fall," says C. M. White, chairman.

J&L sees an $800 million year in sales, expects to top the $1 billion sales mark in 1958.

McLouth Steel Corp. reports operations during the first quarter exceeded 100 per cent of rated capacity, looks for 1957 to be as good as 1956.

Wrapup — While the cost-price squeeze is affecting some, most firms' profits are on the rise. Except for a few isolated instances, 1957 is pegged as at least as good a year as last, probably better. An all-time high for metalworking earnings is possible.

Westinghouse researcher is shown in remote control test of radioactive matter

Research Is Big Business

It has grown from a scientific adventure to a $6-billion industry which represents 1.5 per cent of the gross national product and has an employment of 500,000

INDUSTRIAL research is one of our biggest businesses, E. Duer Reeves, executive vice president of Esso Research & Engineering Co., told the National Industrial Research Conference in Chicago.

From a $400-million activity in 1930, research has grown to a $6-billion industry with more than 500,000 employees.

More than 500 industrial executives were at the conference sponsored by Armour Research Foundation of Illinois Institute of Technology.

Romantic—Research has grown "from a romantic scientific adventure into one of the nation's basic industries," Mr. Reeves continued. "But even more important has been its corresponding growth in responsibility and prestige."

It is now an important part of a company's operation, he pointed out, and a definite part of its competitive strength.

Responsibilities—Mr. Reeves laid down five obligations that a research organization must meet to be effective:

1. Know what technology the company needs. 2. Create the needed technology. 3. Bend every effort to help the company use technology effectively. 4. Carry on its internal operations efficiently. 5. Be an effective member of the management team.

Incentive — Dr. John T. Rettaliata, president of Illinois Tech, told the conference to emphasize incentive "to make the most effective use of the gifted individual."

Warning that existing techniques are near the point of diminishing returns, he urged that invention and research be stimulated.

Creative Man — "While large numbers of engineers and scientists will be needed, it will be the creative man who will make the greatest contribution toward reaching our future objectives," said Dr. Rettaliata, adding:

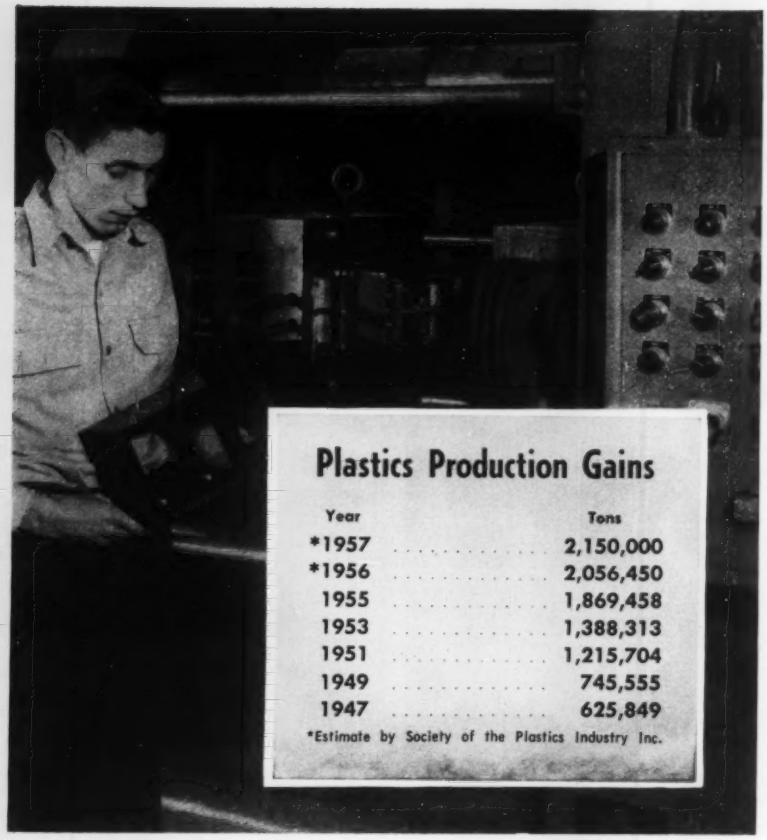
"Effective use of the creative man requires an understanding and tolerant attitude which recognizes that ideas can be more important than facts; and imagination, even intuition, more important than logic."

Conservation — Waste products can be upgraded if a company uses an organized approach to the problem, said Victor Conquest, vice president in charge of research at Armour & Co. He recommended that a company facing such a problem should:

1. Do everything to properly evaluate possible uses of the product with a minimum of processing. 2. Learn all about the waste product, its physical and chemical characteristics and its reactivity under all conditions. 3. Provide creative and unrestricted thinking to the development of all aspects of the material and its derivatives.

Patience — Then, Mr. Conquest advised: "Take a double dose of patience and you will be rewarded handsomely, and you will not have the disagreeable tag of 'waste product' in your operations."

If the investigating group is furnished with adequate facilities and ideas developed are followed up on a scientific basis, "any waste product problem will be solved," he said.



Plastics Production Gains

Year	Tons
*1957	2,150,000
*1956	2,056,450
1955	1,869,458
1953	1,388,313
1951	1,215,704
1949	745,555
1947	625,849

*Estimate by Society of the Plastics Industry Inc.

Hydraulic Press Mfg. Co.

Plastics Needs New Tools

PLASTICS production is breaking all records. In 1956, producers enjoyed their first 2-million-ton year, to the delight of equipment makers who are beginning to design more machinery for the fast-growing industry.

Slow Start—Ten years ago, plastics production was only 625,849 tons. Molders had to make shift with equipment designed for other industries. They used extrusion machinery engineered for rubber and presses intended for metalworking.

Producers want no more hand me downs. Continued growth of the industry, they argue, hinges upon the availability of machines designed expressly for plastics.

Automation—"You can't boost output of reinforced plastics without modern equipment," comment sales officials of Erie Engine & Mfg. Co., Erie, Pa. "There's a constant trend toward automation in our transfer molding and laminating presses. Automatic controls provide more uniform production."

Help—"Press manufacturers are designing specialized machinery to meet plastics' changing needs, as well as broadening standard lines," reports J. J. Littley, sales manager, hydraulic and compacting presses, Baldwin-Lima-Hamilton Corp., Hamilton, O. "Use of pressure permits a more rapid molding cycle."

Molding Machinery—"The plastics industry has emerged as a major factor in the nation's economy," say sales executives at Hydraulic Press Mfg. Co., Mt. Gilead, O. To meet the needs of molders, HPM designs presses for clamping or holding instead of for pressure drawing, as in metalworking. After the material has been forced into a mold, it must be held under pressure until cured.

The plastics equipment line of F. J. Stokes Corp., Philadelphia, has "virtually doubled" in five years. Stokes reports a trend toward more automatic compression and injection molding presses. "Plastics' growth will definitely continue," sales managers predict.

Extrusion Advances—"Improved heating controls and better die design mark gains in extrusion equipment," says Hale & Kullgren Inc., Akron.

Versatility is important to customers of Lembo Machine Works Inc., Paterson, N. J. They're ordering equipment which will laminate, emboss and print plastics in one operation.

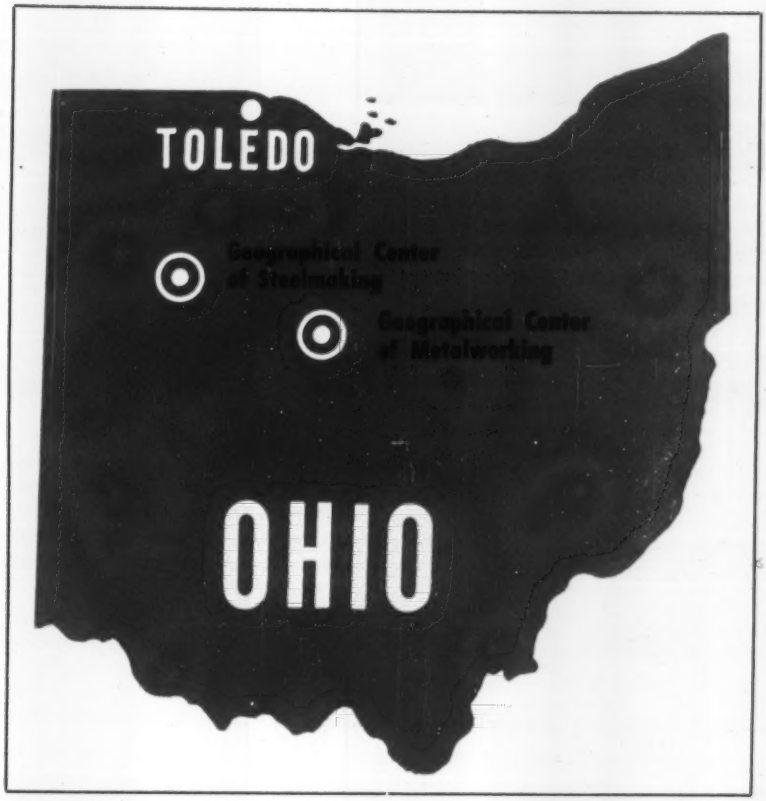
Stewart Bolling & Co. Inc., Cleveland, says sales of mixers and calenders are growing. "Many of our customers must expand. Using the same space and a little more power, we are doubling capacity."

Doubt—While most equipment makers forecast continued expansion of the plastics industry and growth of the machinery market, several large press builders are reluctant to enter the field.

"Plastics producers don't invest in equipment as freely as our customers in other industries," they argue. "Press sales are too competitive, profits too low." A sales manager adds: "Plastics is a boom-or-bust industry in its buying."

Stepping into the breach are foreign suppliers. An eastern plastics producer reports that British, Italian and other European tool builders are offering him high quality machinery and extrusion equipment at low prices.

Optimism—Although tough competition discourages several potential suppliers, long term views are all optimistic. As one equipment maker sums up: "Competition from manufacturers with new equipment forming plastics to rigid specifications will force many alley shops to modernize. We're providing plastics manufacturers with machinery they need now and will have to have in the future."



Steel: F.O.B. Toledo?

TOLEDO, O., with nary a steel plant, is being eyed by several steel companies as a site for one.

Around this Lake Erie port city (population, 333,330) you can pick up reports that interest has been shown by U.S. Steel Corp., Bethlehem Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp. and Kaiser Steel Corp.

Kaiser probably won't build there. It just upped its $113 million expansion program by $81 million to double its ingot capacity (STEEL, Apr. 15, p. 80).

Looking—Rotary Electric Steel Co., a Detroit company which will be merged into J&L on May 1, has been studying sites for a stainless sheet and strip mill in the Toledo-Detroit area (STEEL, Mar. 18, p. 57). The site selected likely will become the location for any steelmaking furnaces Rotary installs in the future.

While there are no steelmaking plants at Toledo, there is some ironmaking. Interlake Iron Corp., Cleveland, producer of merchant pig iron, has two blast furnaces (annual capacity, 551,000 net tons) and 518,000 net tons of cokemaking capacity in that city.

Into Focus—Toledo comes into the steelmakers' view when they look over the needs for their industry's expansion. It will have to add an average of 4 million net tons of ingots a year until 1970 (STEEL, Sept. 17, 1956, p. 134).

Two things will force the industry to look for new sites: 1. Present mill sites eventually will be filled (J&L's plant at Pittsburgh is already filled). 2. Steel companies want to remain near their markets, which have moved somewhat through the growth and decentralization of the metalworking industry.

Toledo is strategically located marketwise. It is within 75 miles of the geographical centers of metalworking and steelmaking (see accompanying map.) Ohio's hold on the center of metalworking is becoming firmer as new automotive plants spring up in the Buckeye state.

Turnabout—Because of its automobile industry, Michigan used to be the No. 1 consumer of carbon steel, and Ohio was close behind in the No. 2 spot. A year from now, it is likely that the standings will be reversed.

A Toledo steel mill not only would be near the Ohio markets, but it would be within 55 miles of the Detroit consumers and 233 miles of the big Chicago market, where steel consumption exceeds production.

Hub—Toledo is served by 13 railroads and 122 motor freight companies. Thirteen state and federal highways go through the city. The Ohio Turnpike is at its southern edge, and the Michigan-Ohio Turnpike which passes through it is near completion.

This port city is at the mouth of the Maumee river on the westernmost end of Lake Erie, but it has the protection of Maumee bay. Water transportation is available for such heavy raw materials of the steel industry as iron ore, limestone and scrap. Limestone also may be transported by land from nearby sources. Opening of the St. Lawrence Seaway in 1959 will make it possible to import raw materials via water from any foreign port and to ship finished steel abroad.

Water, Water—The vast amounts of water needed by the steel industry are available from the Maumee river or Lake Erie. It takes, for instance, 57 tons of water but only 3.2 tons of solid materials to make a ton of pig iron.

The Toledo Industrial Development Council had the University of Toledo's Dr. Louis Hough analyze the city's advantages in a report entitled, "The Economics of Steel Production in the Toledo

Area." Leslie E. Thal, industrial development manager, Toledo Chamber of Commerce, sets forth the city's merits in the chamber's "1957 Toledo Factual Report." Another booster is the Industrial Development Department of the Toledo Edison Co., the city's supplier of electricity.

Development Room—There is plenty of land, says Robert E. Johnson, manager of the Toledo Industrial Development Commission and Toledo Edison's Industrial Development Department. Toledo has 33 square miles of unzoned land on its eastern side, adjacent to Maumee bay and Lake Erie. Valued at $700 an acre for farm use, it is priced at $1200 and $1500 an acre for industrial use, and probably will be more expensive if industry moves in. Foundation borings show that the property is mostly clay, underlaid with limestone, and will support heavy loads.

A Toledo realtor is advertising 922 acres as "the finest industrial site on the Great Lakes" as a location for an oil, chemical or steel plant. Toledo already is an oil refining center. It's noted, too, as a glass producer.

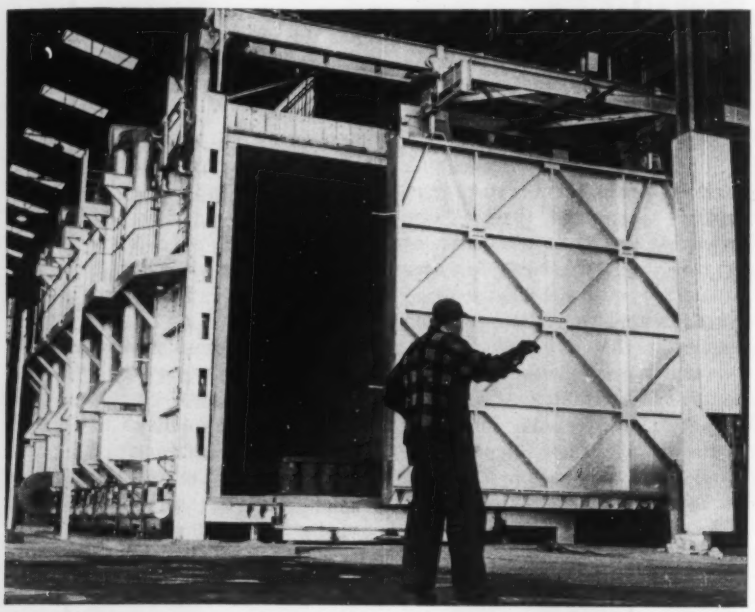
Pledges—Richard Gosser, international vice president, UAW-CIO, says organized labor will not thwart industrial expansion plans. The unions have made four pledges: 1. There will be no jurisdictional fights in Toledo. 2. Incoming industries can come to a prior agreement with labor leaders as to which union will be allowed to organize the plant. 3. New industries will not be subjected to unreasonable wage demands. 4. Small plants already in town will get the same consideration if they expand.

Tax Advantages—By being in Ohio, Toledo can point to tax advantages, although the city has a 1 per cent personal income tax.

A Research Bureau Memorandum from the Pennsylvania State Chamber of Commerce, Harrisburg, Pa., shows Ohio is well down the list of states in the taxing of business.

In 1956, 17.7 per cent of the state tax collections in Ohio came from direct taxes on business. In the adjoining state of Michigan, the percentage was 20.5. Percentages in the other seven states listed are: Pennsylvania, 39.1; Massachusetts, 27.9; New York, 27.6; North Carolina, 26.7; New Jersey, 19.1; Maryland, 16.7; California, 15.8; and Illinois, 11.7.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



New Stress Relieving Furnace for West Coast

U.S. Steel Corp. recently put this 2100°F furnace into operation at San Francisco. It measures 18 x 18 x 61 ft. and is fired by 65 natural gas burners

How Defense Buys

Aircraft and missile makers win more contracts as many larger firms get less of the pie

SUBCONTRACTORS take note: The accompanying list tells you who controls 68.7 per cent of the net value of military prime contracts awarded from January, 1955, through June, 1956.

It's a good guess that it shows a trend in Defense department buying which will continue for years. There has been a shift in contract awards. Examples: General Motors Corp., ranked first until recently, has dropped to 14th. Republic Aviation Corp. fell from 11th to 20th. Many major suppliers of the Korean War period are missing.

Patterns—Diversification makes it difficult to categorize corporations by industry but these patterns stand out: 1. The top 20 firms are in the missile-aircraft-electronics business. 2. A dozen oil-chemical firms are on the latest list, and all but one have improved their positions in the last few years. 3. Only two steel firms are on the list. 4. Four of the five rubber companies are present, but the smallest leads the pack. 5. Only three of the five major auto firms are mentioned. 6. Only one farm machinery manufacturer made it.

Possible reasons for the changes: 1. Some firms were so loaded with business before 1955 they failed to bid on any new business through June, 1956. 2. The declining position of some firms within their own industries (Studebaker-Packard Corp.). 3. Diversification in the direction of more defense business (General Tire & Rubber Co.). 4. Decision to seek less defense business (Chrysler Corp.). 5. Internal trouble (Westinghouse Electric Corp.'s long strike).

Subcontracting — Although the top 100 firms on Defense department's 1955-56 list account for $17.6 billion in contracts, Defense believes 56.9 per cent is paid out to other firms in subcontracts. Defense gueeses at least 20.7 per cent of the $17.6 billion goes to small businesses.

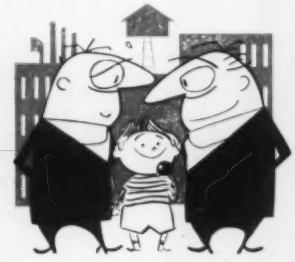
100 Top Military Suppliers

(January, 1955—June, 1956)

RANK	Net value of prime contracts (millions)	Per cent of $25.6 billion (value of all prime contracts)
1. North American Aviation Inc.	$1,341	5.2
2. General Dynamics Corp.	1,340	5.2
3. United Aircraft Corp.	1,274	5.0
4. General Electric Co.	1,051	4.1
5. Boeing Airplane Co.	1,016	4.0
6. American Telephone & Telegraph Co.	747	2.9
7. Ford Motor Co.	697	2.7
8. Lockheed Aircraft Corp.	658	2.6
9. Douglas Aircraft Co. Inc.	593	2.3
10. McDonnell Aircraft Corp.	522	2.0
11. Hughes Aircraft Co.	477	1.9
12. Curtiss-Wright Corp.	464	1.8
13. Glenn L. Martin Co.	406	1.6
14. General Motors Corp.	326	1.3
15. Bendix Aviation Corp.	295	1.1
16. International Business Machines Corp.	275	1.1
17. Chance Vought Aircraft Inc.	222	0.9
18. Radio Corp. of America	221	0.9
19. Sperry-Rand Corp.	216	0.8
20. Republic Aviation Corp.	201	0.8
21. Standard Oil Co. (N. J.)	193	0.8
22. Raytheon Mfg. Co.	180	0.7
23. Brown-Raymond-Walsh (a)	174	0.7
24. General Tire & Rubber Co.	161	0.6
25. Merritt-Chapman & Scott Corp.	141	0.6
26. Goodyear Tire & Rubber Co.	134	0.5
27. Northrop Aircraft Inc.	131	0.5
28. Philco Corp.	124	0.5
29. Avco Mfg. Corp.	120	0.5
30. Standard Oil Co. of Calif.	113	0.4
31. Westinghouse Electric Corp.	102	0.4
32. Bethlehem Steel Corp.	100	0.4
33. General Precision Equipment Corp.	98	0.4
34. Continental Motors Corp.	93	0.4
35. Collins Radio Co.	89	0.3
36. Fairchild Engine & Airplane Co.	89	0.3
37. Cities Service Co.	88	0.3
38. Vertol Aircraft Corp.	85	0.3
39. The Texas Co.	82	0.3
40. Socony Mobil Oil Co. Inc.	77	0.3
41. Bell Aircraft Corp.	75	0.3
42. Firestone Tire & Rubber Co.	73	0.3
43. Burroughs Corp.	71	0.3
44. Tide Water Associated Oil Co.	70	0.3
45. Minneapolis-Honeywell Regulator Co.	69	0.3
46. Sundstrand Machine Tool Co.	68	0.3
47. Olin Mathieson Chemical Corp.	68	0.3
48. Hayes Aircraft Corp.	67	0.3
49. Pomeroy-Hawaiian-Bechtel (b)	66	0.3
50. Gilfillan Bros. Inc.	65	0.3
51. U. S. Rubber Co.	65	0.3
52. Alco Products Inc.	65	0.3
53. Food Machinery & Chemical Corp.	65	0.3
54. U. S. Hoffman Machinery Corp.	61	0.2
55. American Bosch Arma Corp.	61	0.2
56. Eastman Kodak Co.	60	0.2
57. Phillips Petroleum Co.	60	0.2
58. Mine Safety Appliances Co.	57	0.2
59. Lear Inc.	56	0.2
60. Shell Oil Co.	56	0.2
61. Northern Pump Co.	56	0.2
62. ACF Industries Inc.	55	0.2
63. Massachusetts Institute of Technology	55	0.2
64. Garrett Corp.	54	0.2
65. Bath Iron Works Corp.	54	0.2
66. International Telephone & Telegraph Co.	52	0.2
67. North Atlantic Constructors	50	0.2
68. Consolidated Diesel Electric Corp.	49	0.2
69. International Harvester Co.	48	0.2
70. Dynamics Corp. of America	46	0.2
71. Air Products Inc.	45	0.2
72. Westinghouse Air Brake Co.	43	0.2
73. Richfield Oil Corp.	43	0.2
74. Motorola Inc.	43	0.2
75. Morrison-Knudsen Co. Inc.	43	0.2
76. States Marine Corp.	41	0.2
77. E. I. du Pont de Nemours & Co.	41	0.2
78. U. S. Steel Corp.	40	0.2
79. American Machine & Foundry Co.	39	0.2
80. Chrysler Corp.	39	0.2
81. California Institute of Technology	38	0.1
82. Continental Oil Co.	38	0.1
83. Associated Contractors (c)	38	0.1
84. Sinclair Oil Corp.	37	0.1
85. Puget Sound Bridge & Dredging Co.	37	0.1
86. Standard Oil Co. (Ind.)	36	0.1
87. Procter & Gamble Co.	36	0.1
88. Ingalls Iron Works Co.	36	0.1
89. Drake-Merritt (d)	34	0.1
90. Cessna Aircraft Co.	33	0.1
91. Peter Kiewit Sons Co.	33	0.1
92. Hazeltine Corp.	33	0.1
93. Brown-Pacific-Maxon (e)	32	0.1
94. Standard Coil Products Co.	32	0.1
95. California Eastern Aviation Inc.	31	0.1
96. J. H. Pomeroy	31	0.1
97. R. E. McKee General Contractors Inc.	31	0.1
98. Todd Shipyards Corp.	31	0.1
99. Union Oil Co. of Calif.	30	0.1
100. J. W. Bateson Co.	30	0.1

(a) Joint venture of Brown & Root Inc., Raymond Concrete Pile Co. and Walsh Construction Co.
(b) Joint venture of J. H. Pomeroy, Hawaiian Dredging Co. Ltd., and Bechtel Corp.
(c) Joint venture of Dunn Construction Co. Inc., Blount Bros. Construction Co., Patterson-Emerson-Comstock Co. of Ala., Inc., and Girdler Co.
(d) Joint venture of Johnson Drake & Piper International Corp. and Merritt-Chapman & Scott Corp.
(e) Joint venture of Brown & Root Inc., Pacific Bridge Co. and Glen L. Maxon et al.

Corporate Tax Cuts? Don't Kid Yourself



THE ODDS are against corporate tax relief. The rendering of lard from the budget can't be interpreted to mean that federal revenues will be slenderized accordingly. Here's how the situation shapes up as Congress reconvenes today (Apr. 29), following its Easter recess.

Congressmen have had a chance to talk with the folks back home, and they have a clearer understanding of the deluge of mail they've been receiving since Treasury Secretary George M. Humphrey's "hair curling" speech.

Pressure groups have inspired a lot of constitutents to take pen in hand, but much of the mail represents the sincere feelings of the average citizen.

Balanced Budget—The administration is of the same frame of mind. It still stands firmly for its balanced budget. The President's letter to House Speaker Sam Rayburn (Dem., Tex.), recommending budget cuts of $1.9 billion, carefully states: "For the first time in a quarter of a century, we have in prospect three balanced budgets in a row."

This much is certain: Cuts in corporate taxes will be out of the question if Democrats manage to reduce personal income taxes by Jan. 1, 1958. A boost of $100 in the exemption rate for each dependent will cost the government over $2 billion in lost revenue, says one Treasury official. It looks as if the President anticipates losing that revenue, but no more.

Big Ones—And don't forget: Congress has to be practical as well as political. Despite the noise so far, it has yet to get to three special budgets—defense, foreign aid and farm aid. Foreign aid seems the most likely place to cut, but the President may not stand for it. In the final analysis, all sorts of pressures can be brought by him to push it through just the way he wants it. If he refuses his backing to certain Republican candidates next year, for example, you'll see most of his party line up behind him on the foreign aid budget.

How about the $38 billion for defense? Consider these thoughts of Defense Secretary Charles E. Wilson: "We are spending $1.25 billion a year from the procurement account of the Defense department. Much of the money is coming from funds appropriated during the last year of the Korean War, when we expected it to go on a little longer. If we were not now spending those leftover funds, we would need an additional $800 million in our fiscal 1958 budget."

That Korean money won't last forever. And unless we radically revise our defense program, any money cut from other parts of this year's budget must be returned next year, say Defense spokesmen. Another thought: Britain's cutback in defense funds was undoubtedly made on our assurance that we wouldn't do the same thing.

In 15 Months—The present corporate tax rate structure will come up for renewal June 30, 1958, just four months before elections. Did you ever hear of a more unlikely time to vote for reduced corporate taxes? You'll stand a better chance of seeing them raised to allow a bigger cut in personal income taxes.

Get your slide rule out. The profit squeeze will get even rougher as we move into next year.

Phaseout of the B-52

Obviously hoping to forestall congressional rancor, the Defense department dropped this bomb the day Congress left town for its Easter holiday: Production of the Boeing B-52 intercontinental bomber will be leveled off at 15 per month, instead of being built up to 20 a month. The total number to be made remains the same (603), but production will be extended six months. Defense claims production capacity of 20 a month will be retained but for how long is another question.

The B-58—The slowdown in B-52 production allows Defense to do three things: 1. Receive more of an "improved model B-52." 2. Decide just how good the B-58 is. 3. Continue to evaluate missile vs. aircraft problems. Mr. Wilson's explanation of the move: "It now looks like we have more time to do an orderly job." Latest intelligence reports discount our loss of position in the airpower race with Russia, say Defense spokesmen.

Convair's B-58 is rated successful, though it is not a substitute for Boeing's B-52. Eighteen test models of the B-58 will be built in fiscal 1958; look for large scale production in 1959. Total Air Force procurement in fiscal 1958: $2.7 billion for 1515 bombers, fighters, transports and trainers. KC-135 tanker aircraft production is scheduled to be held down to 15 a month. Bomarc, the long range interceptor missile, will go into production in fiscal 1958. The switchover from bombers to missiles may not be as far away as most sources think, but Defense still claims we'll count on B-52s to protect us through 1962.

Monday morning quarterbacking department: This was a sharp move by Defense. Floor talk about the slowdown by Sen. Stuart Symington (Dem., Mo.), and other airpower minded Congressmen, will tend to forestall the budget cutters.

Morgan Quality in Action

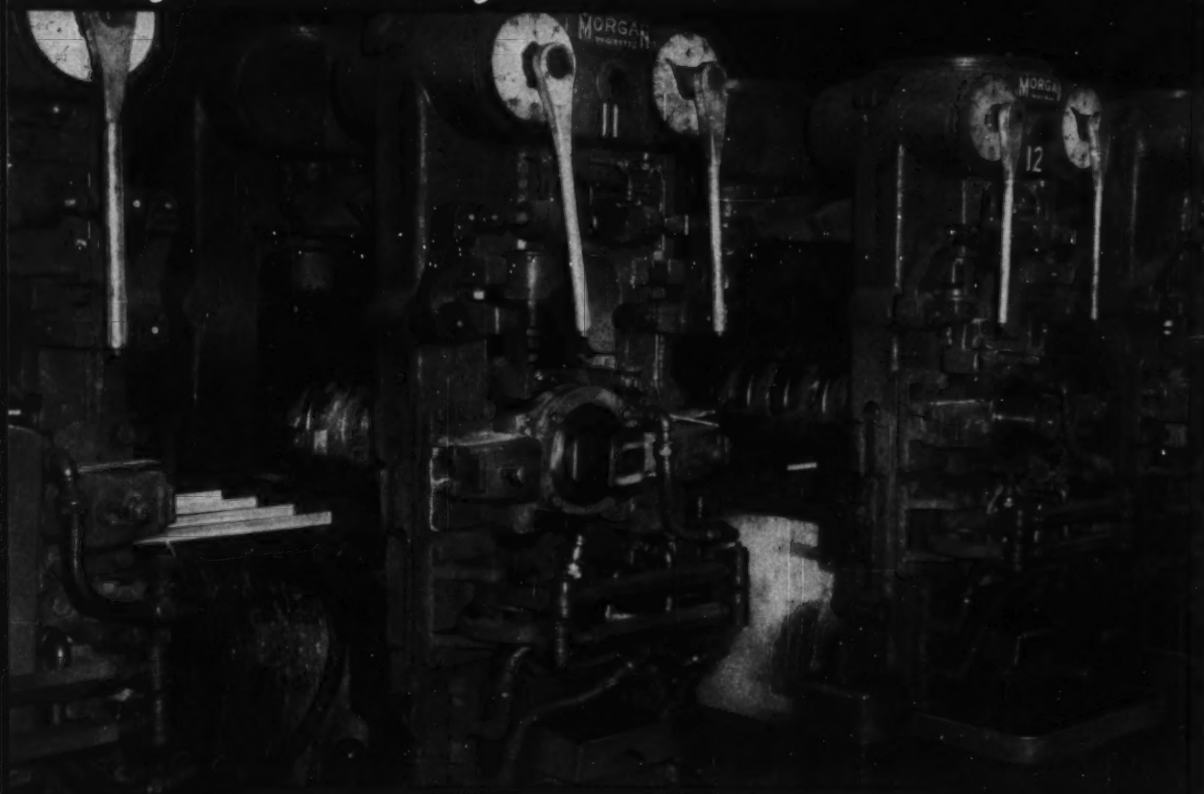


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Photo courtesy of Jones & Laughlin Steel Corporation

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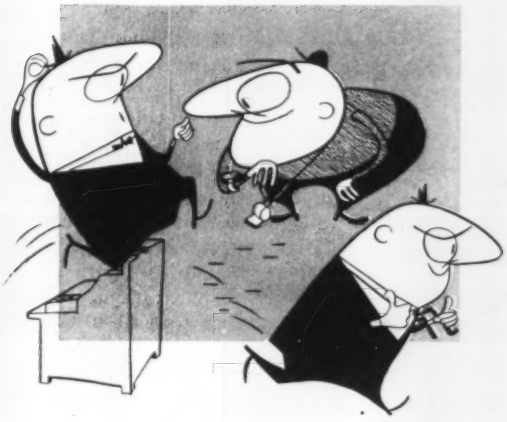


To help users of complex equipment over hurdles . . .

IBM Trains Its Customers

IBM started its customer training program in the 1930s when a new user told the company: "We'd like to attend a course to learn more about the use of your machines."

Since then, some 39,000 customers have matriculated at International Business Machines Corp.'s training centers in Poughkeepsie and Endicott, N. Y. During the fourth quarter of this year, IBM plans to open another training school at San Jose, Calif. Some 6000 customers are expected to attend the five-day sessions this year.

Basic—While each group has special interests, these points are woven into each course: 1. Feasibility studies on the need for computers. 2. Areas which can be successfully converted (manufacturing control, warehouse stock records, payroll) to electronic data processing or punched card systems. 3. Selection and training of personnel. 4. Handling the transition period. 5. Programming. 6. Test data. 7. Evaluation studies.

Top and middle managers are shown how single and multiunit systems work. Basic theory needed to understand machine functions is discussed at workshop sessions. Groups which have problems peculiar to their industry (airlines, insurance companies, public utilities, military) are brought together in special courses.

Who Teaches — Salesmen from the field staff the training centers. "They are the logical men to make the presentation since they have a thorough understanding of the product line," says IBM. About 13 full-time instructors man the two facilities. Other salesmen are brought in to help with special classes.

Instructors are hand picked. Taken into consideration are: How the salesman looks, acts, thinks on his feet and his ability to perform well in an informal atmosphere. Those who qualify are converted from line to staff (usually for two years). It can be a stepping stone. Some benefits: 1. The salesman-instructor gains a better perspective of manufacturing problems and processes. 2. He gains increased confidence. 3. He is in on the development of new equipment and sales techniques. 4. He associates with a broad cross section of management men from user organizations.

Informal—Both training centers provide quarters and meals for trainees. After hours, instructors discuss service conditions, ideas for new or expanded applications, as well as the need for different types of machines.

"It's interesting," one student told STEEL. "You can't go out on the town; there's no town. So you thoroughly enjoy the facilities and find yourself being drawn into intelligent discussions on computer problems."

Instructors become wiser, too: "You would be amazed by how much we learn by listening to these men who are living with our equipment every day," said one. "While they are relaxed and away from their offices, they take time to analyze the problems that need to be licked. We can often pass along their thoughts to our engineering departments or recommend solutions on the spot."

Human Relations—The Endicott facility can hold three classes simultaneously. This brings a diversity of people together. During offhours, military experts mingle with banking, insurance and manufacturing officials. Reports one instructor: "This helps to build mutual respect, makes industrial executives aware that most military men are vitally interested in businesslike efficiency."

Take-Home Pay—Here's what students have to say about the program: 1. "I will be able to get more out of our system." 2. "I received new insight into merging our present system with one new piece of equipment." 3. "I will put greater emphasis on programming." 4. "I better understand the entire concept of electronic data processing."

Cost: IBM isn't telling, but says that it is a minor consideration when stacked against the multiple advantages of having the opportunity to teach 6000 customers more about its products each year.

Eases Aluminum Scrap Exports

Aluminum scrap and remelt ingots originating in U.S. possessions or territories outside continental U.S. may be exported in unlimited quantities. Reason given: Improved domestic supplies.

The Bureau of Foreign Commerce, in removing both items from the 8000-ton quota for export, said exporters must certify points of origin. Restrictions remain on exports from continental U.S.

Extra pay, more time off are the trends . . .

Vacations Are Expanding

THE VACATION fringe continues its gradual growth. The trend this year is to longer vacations for fewer years of service.

Many companies are giving three weeks to workers with ten years of service. In one midwestern city 19 per cent of the companies contacted have this policy. Stewart-Warner Co., Chicago, is in this category. It urges workers to take their third week either just before or after the plant's two-week shutdown in July.

Motorola Inc., Chicago, gives its workers two weeks after they have been with the company two years. For each additional year, the worker gets an additional day's pay (up to a maximum of five).

After seven years, the worker gets two weeks' vacation plus an extra week's pay.

Union contracts in the aluminum and steel industries next year will boost the number of workers getting extra vacation pay (see table at right).

Even More—Some workers get four weeks. A survey of the Employers Association of Detroit shows 18 per cent of the respondents grant some nonsupervisory salaried employees that much time off. The usual service requirement is 20 or 25 years.

Another Trend—There are indications that the split vacation is gaining in popularity. The steelworkers' contracts provide that vacations of two or three weeks may consist of separate periods of one week each.

Close the Doors—Plant shutdowns for vacations seem to be on the increase. Last year a survey of metalworking companies in the Philadelphia area showed that 100 out of 137 did so.

This year it looks like more will shut down than last year.

The Gray Iron Founders' Society, Cleveland, expects that most of its members will close down for two weeks this year. Last year, customer demand forced many foundries to operate and stagger their vacations. A society spokesman describes the situation this year: "We're doing all right, but we aren't under as much pressure as last year."

July will continue to be the most popular vacation month.

Vacation Policies Liberalized In Steel and Aluminum Industries*

THIS YEAR

Years of Service	Vacation
1	1 week
5	2 weeks
15	3 weeks

NEXT YEAR

Years of Service	Vacation
1 to 3	1 week
3 to 5	1½-weeks' pay for 1 week off
5 to 10	2 weeks
10 to 15	2½-weeks' pay for 2 weeks off
15 to 25	3 weeks
25 or more	3½-weeks' pay for 3 weeks off

*Provided in United Steelworkers of America contracts.

Court Rules for Union

A Birmingham circuit court has ruled that some 15,000 members of the United Steelworkers of America who refused to cross picket lines set up by other unions are entitled to unemployment compensation.

In 1955, railroad conductors at U.S. Steel Corp.'s Tennessee Coal & Iron Division, Fairfield, Ala., struck in a contract dispute, forcing a shutdown of all operations for several weeks. In 1956, engineers and firemen walked out on Apr. 28, again forcing a cessation of operations. On July 1, the United Steelworkers struck.

Circuit Judge Thomas Huey ruled the steelworkers were entitled to compensation during the length of the strike in 1955 and from Apr. 28 to July 1 in 1956. The company has argued that by refusing to cross picket lines, the steelworkers actually became a part of the strike and were not entitled to compensation.

Union sources estimate approximately $2 million is due members.

Westinghouse Goes to L.A.

A manufacturing and repair plant is being built by Westinghouse Electric Corp., at Compton, Calif., near Los Angeles. It will have 80,000 sq ft of space and is to be completed in November.

About 200 will be employed in making electrical apparatus, such as switch gear, control boards and panel boards; they'll also repair large apparatus, including transformers.

An appraisal may help you solve these problems:

Insurance—fire and other indemnity.

Taxes—local, state and federal.

Finances—buying, selling or borrowing.

Law—civil and condemnation suits; tax and other statutes.

Accounting—department functions, property records and depreciation.

Liquidation—suspension of a company, a division or subsidiary.

Reports—stockholders sometimes want to go beyond the books to find actual company value.

Appraisal: Valuable Tool

More companies are finding that it can save money and aid management in solving difficult problems. Firms are discovering other benefits, too

A MICHIGAN auto parts supplier recently learned that a new highway would cut across company property. The city offered $70,000 for a quick settlement. An appraisal firm was called in and the company went to court. Result: An award of $270,000.

An Ohio metalworking plant had $550,000 capitalized on its books. A professional appraisal showed that it was $62,000 too much.

Never Counted—Dollars that a company has in the bank are carefully counted every month. Dollars that it has invested in plant and equipment may never be properly or accurately counted without an appraisal by a competent firm.

An accurate, informed report of actual or "dollar" value gives management a valuable tool for more intelligent and efficient action in many of the complex phases of modern business.

Big Three—There are three large appraisal firms in the U.S.: Manufacturers' Appraisal Co., Cleveland; American Appraisal Co., Milwaukee; and Lloyd-Thomas Co., Chicago. The American Society of Appraisers, Washington, has 1000 members registered as qualified appraisers.

A professional appraisal has many uses. 1. It is accepted as a correct evaluation by insurance companies in settling losses. 2. It is accepted as expert testimony by courts in condemnation and other civil suits. 3. It is accepted as an accurate evaluation by local, state and federal tax officials.

Cuts Cost—"It is always the aim of an ethical appraisal organization to search and find more uses for the information it has been paid to accumulate," says Herman L. Haynes, vice president of Manufacturers'. "If we can do this, we accomplish two things. In effect, we cut the cost of the appraisal and furnish our client with useful data he may never have had before.

"We feel that it is an obligation of the appraisal business to develop these services to reduce the cost per report to the client."

Costs vary widely, but often savings more than pay for the service.

Insurance—Many portions of a plant are considered "uninsurable," such as wells, excavations, underground piping, foundations, concrete or steel bridges, bins, kilns, chimneys and other practically indestructible items.

But all those items have a value on company books and are included in the over-all evaluation. If insurance is carried on what the accounting department shows the company is worth, the premium may be higher than is necessary for adequate protection. An appraisal will correct the situation.

Taxes—Assessments are usually a percentage of "fair market value" at the time taxes are levied. In this day of equalization programs, a professional appraisal is one sure way a company can check the figures of the tax authority for inequities.

When plant facility is bought for other than book value, an allocation is required for depreciation of individual items. This is difficult without a detailed appraisal, and the taxes saved in one year often can pay for the report.

List Grows—Some other benefits: 1. Separation of good will and land from depreciable items. 2. Removal of items that should not be capitalized. 3. Installation of property ledger system. 4. Accounting for all assets, expended or capitalized. 5. Detailed equipment data for engineering and maintenance.

Big Foreign Jobs for Koppers

Koppers Co. Inc., Pittsburgh, will design and erect a battery of 45 Koppers-Becker coke ovens at the Hamilton, Ont., works of Dominion Foundries & Steel Ltd. The installation will increase the Canadian firm's coke making capacity 75 per cent. Koppers will also design and erect an open hearth furnace with a capacity of 200 metric tons for Compania de Acero del Pacifico, Santiago, Chile.

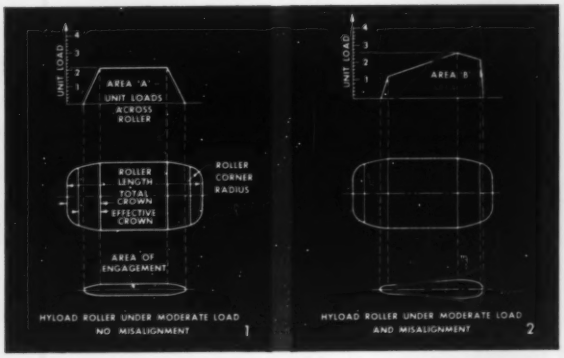
ONE OF A SERIES . . .

What makes Hyatts run smoother and longer?

PROPER LOAD DISTRIBUTION ON ROLLERS

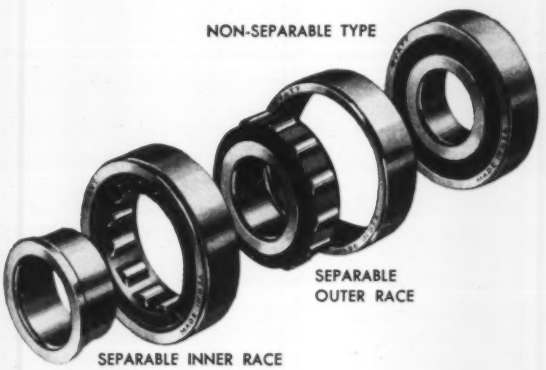
In any roller bearing, the design and quality of the rollers themselves vitally affect the performance of the entire bearing. The distribution of the load, both within the roller's area of contact and across the roller, must be expertly engineered. End-loading and conditions of misalignment can seriously reduce the life of a roller bearing. How HYATT minimizes these effects is detailed at the right.

You will find full selection and application data in HYATT Catalog 150, or call your nearest HYATT Sales Engineer. Hyatt Bearings Division, General Motors Corporation, Harrison, N.J., Pittsburgh, Detroit, Chicago and Oakland, Cal.



ROLLER CROWNING MINIMIZES EFFECTS OF BEARING MISALIGNMENT

The unit load on any roller is distributed axially in a uniform manner except at the ends where crowning has been provided. Figure 1 shows how the unit load drops off to zero at the ends of the area of contact. The summation of unit loads represented by area "A" is the total roller load. This same load under conditions of misalignment (Figure 2) must result in an area "B" equal to area "A"; but the maximum unit load is considerably greater and the misaligned bearing will therefore have a shorter life. However, if the same total load is applied to an uncrowned roller in a misaligned bearing, as shown in red, a much higher unit load (area "C") results, which would still further reduce the life of the bearing. This demonstrates graphically why HYATT Hy-Load Series Bearings with roller crowning will run smoother and longer under conditions of misalignment.



GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

U.S. Passenger Car Production*

(Thousands of units)

	1st Quarter†	2nd Quarter	3rd Quarter	4th Quarter	Totals
GM	832	718	517	799	2866
Ford	545	499	356	510	1910
Chrysler	370	281	241	340	1232
AMC-SP	45	62	34	51	192
Totals	1792	1560	1148	1700	6200

*Estimated by STEEL. †Preliminary, Ward's Automotive Reports.

Auto Sales Patterns Shift

General Motors hopes to move up in the last quarter while Ford and Chrysler sales decline. S-P and AMC may have 4 per cent of the year's market

HARLOW CURTICE has a problem. The GM president is wondering when and how he can best revise his 1957 market estimate and still have room for a valid prediction in 1958.

In December, Mr. Curtice predicted: "The industry will produce and the domestic market will absorb approximately 6.5 million passenger cars." Up to now he hasn't repeated this forecast, and it's clearly evident that the domestic market isn't about to absorb 6.5 million cars. The long awaited spring tidal wave of sales has turned out to be a small ripple. Today's most optimistic forecasts peg sales at 6.1 million and output slightly higher.

Off Target—Let's face it: The industry has been wrong three years in a row. It underestimated 1955 and overshot last year. Having bracketed the target, it should have come close in 1957, but again the experts shot high.

While this doesn't enhance the reputations of Ford and Chrysler analysts, it makes Mr. Curtice's crowd look even worse.

Percentages — It's beginning to look like most of the loss will be sustained by Buick, Olds and Chevy in the GM stable. Ford and Chrysler will be selling more cars than they did last year (see table above). Ford turned out 1.6 million cars for 28.2 per cent of the market in 1956. Chrysler produced 17 per cent or 870,261 units. This year, those percentages should be up to 30 for Ford and 20 for Chrysler.

What ails the prophets? Detroit put the blame squarely on the hard facts of economic life:

- Too many of 1955's long-term loans are still outstanding.
- Consumers are resisting higher prices and higher monthly payments.
- Traditional sales patterns have been disrupted.

New Trend—The sudden death of an old buying habit, the spring rush, has caused motor research men untold anguish. Although some marketing experts speak ominously of credit restrictions or long-term financing, the most popular theory is that car buying habits have ceased to be dependent on the weather.

With this trend toward a constant year-round sales campaign, auto makers are spreading steel buying throughout the year. Since they don't have to stockpile against strikes or price hikes, they buy steel as they need it, keeping inventory costs at a minimum.

Watchful—Now is the time when car builders are most cautious. By mid-May they must decide how many more '57 models they must build to satisfy market demand and still not leave too large an inventory when 1958 cars are introduced. *Ward's Automotive Reports* indicates cancellation penalties for components and parts can jump $20 to $200 a car from now until the end of the model run. That's a lot of money down the drain if companies guess wrong.

Detroit Eyes Last Quarter

The questions now being asked in Detroit: How will '58 models affect the balance of this year's sales? Who will profit most from new model introductions?

By the end of the third quarter, the industry should have turned out approximately 4.5 million cars if present trends continue. This means car builders will have to make 1.7 million cars in the last quarter if they are to reach an output of 6.2 million. Most of these will be 1958 models—through which GM hopes to make up for sales lost during the first part of the year. The company is taking about 44.5 per cent of the market now. It can recover lost ground by wresting sales from Ford

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Studebaker's Golden Hawk

The Golden Hawk weighs 3400 lb and is 17 ft long. It has a 275-hp supercharged engine with a 7.5:1 compression ratio. Axle ratio is 3.31:1. Dealer list price, excluding state and local taxes, license and handling fees, is $3100

and Chrysler, who won't be making quite so many changes in '58.

Outlook Favorable for GM

The way things look now, GM won't be able to get its new cars out much before the usual time. Chevy may sneak in by late September, but the rest probably will follow in October.

GM cars will retain their conservative appearance, but it will be a sleek conservatism. Rear quarter panels will look more like fins. Air suspension is scheduled for top lines.

Revamped—Pontiac will have a separate body shell and a frame which follows Cadillac's tubular X design. These changes pave the way for unitized construction.

Chevy supposedly is bringing out a modified version of its Impala dream car to compete with the four-seater Thunderbird Ford is rumored to be preparing.

Buick and Olds are getting facelifts on the quarter panels, plus frame and suspension changes. The split rear windows are slated to disappear in favor of reverse angle windscreens, but the long ridge lines probably will be retained and modified. Rumor has it that these are forerunners of separation lines for doors in the roof.

Across Town—Ford and Chrysler will be redoing this year's cars, and changes will be few. There's talk that Chrysler might bring out a rear end transmission or a split axle. Fins will be smoothed out, particularly on Plymouth and Dodge.

Ford will concentrate on unitized construction for Lincoln (an open secret) and introduction of the Edsel, which everyone agrees will be first out in September. It's the addition of this new Ford line which may bring up total production for the year.

U.S. Auto Output

	Passenger Only 1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
3 Mo. Total	1,792,013	1,742,934
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Mar. 23	138,646	131,287
Mar. 30	130,233	125,850
Apr. 6	130,318	129,829
Apr. 13	126,194	136,038
Apr. 20	119,190†	129,826
Apr. 27	121,000*	127,277

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Little Two Tighten Belts

With all the shifting among the Big Three, Studebaker-Packard and American Motors have received little attention this year.

In the first quarter, they captured only 2.5 per cent of the market, compared with 4.6 per cent last year. That's about one-third less than they need to break even in 1957, but the Little Two are optimistic about their chances.

Rambler—AMC's Rambler has been selling well. So has its Metropolitan. Nash and Hudson sales are almost nonexistent so far as Detroit reckoning is concerned. But Louis Wolfson, financier who holds a heavy block of AMC stock, gives no hint of altering President George Romney's plans. Most observers figure Mr. Romney has a deadline in which to produce. He says: "We'll be in the black by 1958, or I'll be leading the fight for changes."

Some of the things AMC is doing to prune costs are these:

- Bringing out Nash and Hudson station wagons in 1958. They probably will make up the bulk of N-H production.
- Building all AMC cars, except Metropolitan, on a single body shell and, consequently, on a single assembly line.

S-P Plans—Down in South Bend, Ind., Studebaker-Packard confirms what motordom assumed eight months ago when the firm handed management reins over to Curtiss-Wright Corp. (see STEEL, Aug. 20, 1956, p. 87) S-P will market the German Mercedes-Benz starting about May 20. In addition, the Indiana car builder will bring out a low priced line selling between $1700 and $1800.

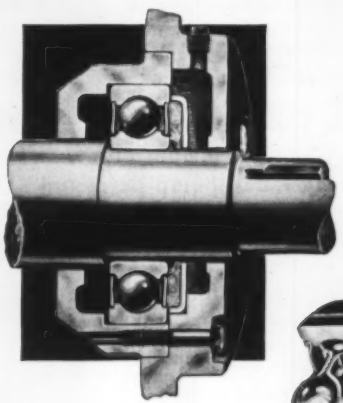
The company still plans to introduce a 1958 Packard and will even add another model which resembles the Studebaker Hawk. Some of these cars will have a modified Daimler-Benz fuel injection system. While these changes may not solve all of S-P's troubles, they'll give the auto maker a more complete line and probably avert catastrophe for at least another year.

FACTS

about

NEW DEPARTURE BALL BEARINGS

Photo: Courtesy of Reliance Electric and Engineering Company



Metering plate adjacent to bearing prevents overlubrication. Excessive grease pressure is relieved *outwards* around shaft. No grease can be forced into motor.

Right: Shielded ball bearing always retains adequate grease supply.

Driving a car shaker is like riding a bucking bronco—and the motor and bearings that do the job have *got to be* tops in every detail for such rugged service.

But even under these rough, tough load conditions, high capacity New Departure ball bearings assure exact rotor location—full electrical and mechanical motor efficiency.

An important feature of the bearing mountings is the use of a "metering plate" which regulates grease flow and prevents excessive grease pressure against the bearings. They cannot be under- or over-lubricated. Yes, motor and bearings are built to maintain precision at operating extremes.

Such motors are safe for long periods without attention—the bearings are fully protected from dirt and there is no grease leakage into the windings. Write for details on New Departure shielded ball bearings.

VISIT NEW DEPARTURE AT THE DESIGN ENGINEERING SHOW, COLISEUM, NEW YORK CITY, MAY 20-23, 1957, SPACE 1240

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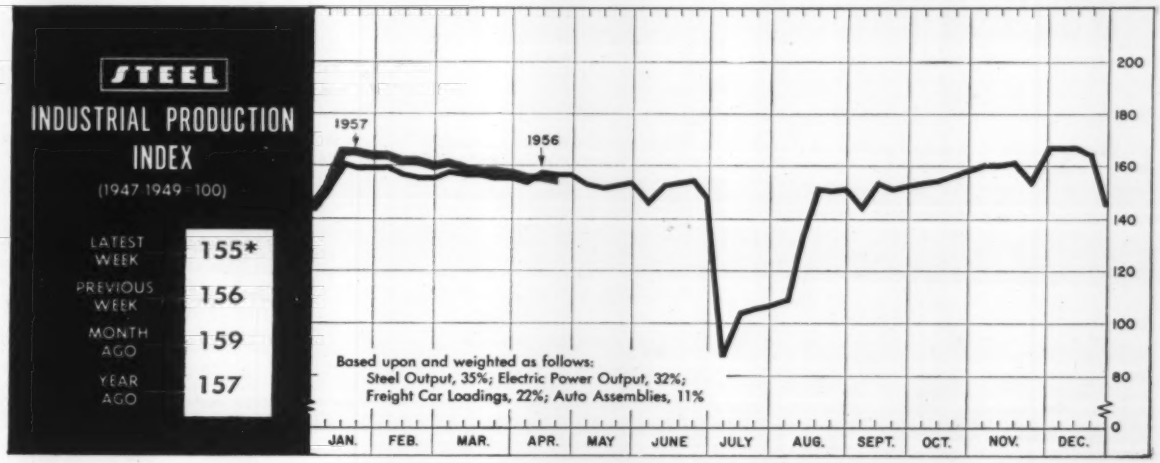

*Week ended Apr. 20.

Break in High Level Plateau To Be Mild

WITH the first month of the second quarter nearly over, it is becoming increasingly clear that the high level maintained by industrial production the last six months is giving way to a mild dip.

The situation is disturbing, but taking it to mean that the bottom is dropping out of the economy is like telling the world's fastest miler that he's slipping when he's clocked at 4:01. He's still running a good race. What's more, forces already at work will limit the condition and reverse it in late third quarter.

Not since last September has the Federal Reserve Board's monthly production index (see chart, page 140) been below 146 (1947-1949=100). That's the longest period of stability at any level in the history of the present index. Beginning with this month, a weakening will set in which will continue into the summer vacation period. Result: The FRB index probably will average about 144 or 145 in the second quarter. In late September or early October, the trend will start up again, perhaps reaching new highs before the year is through.

Villains — Practically all the weakness is in the durable goods sector. Steel operations have been running at about 90 per cent of capacity for the last four weeks—a high rate but not quite what it was in first quarter. A sluggish automotive market is the big reason for the decline, although other segments of the economy, such as appliances, must share the blame. Heavy goods and construction have maintained their peak operations to counteract the weaknesses and keep the economy pretty even.

Heavy backlogs in fabricated structural steel, heavy machinery, oil country goods, freight cars (see chart, page 140) and others will prevent too great a decline in industrial activity. Add to those the usual spring upturn in construction (accentuated this year by road building activity) and you get a floor under the economy.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,310[1]	2,313	2,473
Electric Power Distributed (million kw-hr)	11,650[1]	11,695	10,894
Bituminous Coal Output (1000 tons)	9,910[1]	8,350	9,935
Petroleum Production (daily avg—1000 bbl)	7,400[1]	7,442	7,129
Construction Volume (*ENR*—millions)	$394.5	$344.5	$536.4
Auto, Truck Output, U. S., Canada (*Ward's*)	151,866[1]	160,370	167,530
TRADE			
Freight Car Loadings (1000 cars)	680[1]	674	763
Business Failures (Dun & Bradstreet)	308	231	255
Currency in Circulation (millions)[3]	$30,681	$30,655	$30,290
Dept. Store Sales (changes from year ago)[3]	+7%	+8%	+11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,384	$20,614	$23,098
Federal Gross Debt (billions)	$274.6	$274.5	$276.0
Bond Volume, NYSE (millions)	$15.6	$23.9	$23.9
Stocks Sales, NYSE (thousands of shares)	8,672	11,989	11,635
Loans and Investments (billions)[4]	$86.9	$87.3	$85.4
U. S. Govt. Obligations Held (billions)[4]	$26.3	$26.6	$27.7
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.41	209.10
STEEL's Nonferrous Metal Price Index[6]	239.7	239.4	277.7
All Commodities[7]	117.2	117.2	113.5
Commodities Other Than Farm & Foods[7]	125.3	125.3	121.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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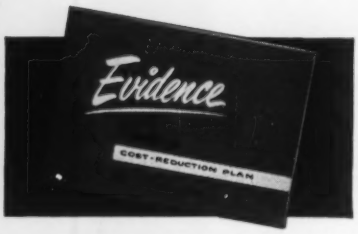

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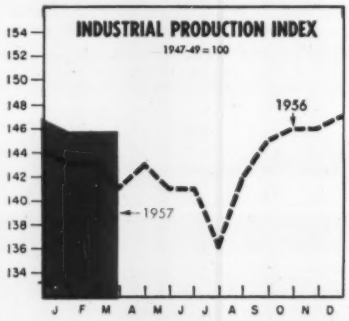
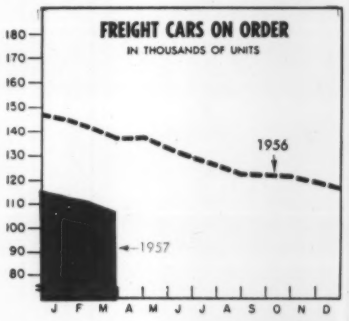
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1957	1956	1957	1956	1957	1956
Jan.	146	143	144	148	180	170
Feb.	146	143	143	146	180	168
Mar.	146*	141	138*	145	179*	167
Apr.	...	143	...	146	...	171
May	...	141	...	141	...	167
June	...	141	...	138	...	168
July	...	136	...	68	...	169
Aug.	...	142	...	124	...	172
Sept.	...	145	...	148	...	176
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.

	Awards		Backlog (end of month)	
	1957	1956	1957	1956
Jan.	5,328	1,818	114,656	144,946
Feb.	6,065	1,675	111,965	141,437
Mar.	5,359	1,618	107,708	137,070
Apr.	....	6,559	.....	137,436
May	....	2,403	.....	133,072
June	....	2,859	.....	129,409
July	....	2,642	.....	126,194
Aug.	....	2,575	.....	122,870
Sept.	....	3,949	.....	122,421
Oct.	....	6,532	.....	122,250
Nov.	....	4,172	.....	119,626
Dec.	....	4,992	.....	117,320
Totals	....	41,794		

American Railway Car Institute.

Charts copyright, 1957, STEEL.

Silver Lining—There's hope even in some of the soft spots. The longer the auto market remains relatively inactive, the better are its chances of bursting forth in a selling spree. Some Detroit experts are holding to their earlier prediction of a 6.5 million car year. That could mean a whale of a fourth quarter. By the nature of our population growth, residential construction can go down only so far before it has to rebound. Many builders believe that credit will loosen this summer and supply the necessary spur to push new starts over the 1 million mark. Appliances would gain on that account. In addition, surveys indicate that the consumer is still willing to part with his cash for many of these items.

For the year, the net result on STEEL's industrial production chart (page 139) could well be a bowl-shaped trend line, high on the fourth quarter side.

Appliance Slump Over?

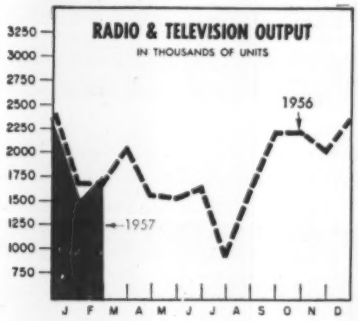
Appliance makers already may be coming out of their slump. Figures for February and March show uptrends in six major items and continuing downtrends in five.

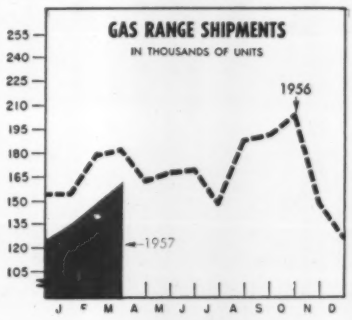
On the up side are standard gas ranges, radio and television sets (see charts, page 141), home freezers, electric and gas storage water heaters and vacuum cleaners. Heading down are electric refrigerators, electric ranges, food disposers, washers and dryers.

Generally, the 1957 figures are still below the corresponding year-ago tabulations. But dealer's inventories reportedly are much lower now than they have been since before last Christmas, making the future production picture a little brighter. At least one of the major stainless steelmakers reports his sales to the appliance industry have been fairly strong over the last month.

Businessmen Optimistic

Businessmen are still "high" on 1957, although their enthusiasm has dampened a bit since the first quarter, reports Dun & Bradstreet Inc. When asked about their expectations for third quarter, compared with the year ago period, 54 per cent of the 1495 firms reporting said there will be an increase in sales; only 10 per cent expect a decrease. D&B's previous survey showed a 12 to 1 vote in expecta-





	Radio		Television	
	1957	1956	1957	1956
Jan.	1,086	1,079	450	588
Feb.	1,265	1,094	465	576
Mar.	....	1,360	...	680
Apr.	....	993	...	550
May	....	1,060	...	468
June	....	1,073	...	553
July	....	567	...	337
Aug.	....	991	...	613
Sept.	....	1,319	...	894
Oct.	....	1,349	...	821
Nov.	....	1,382	...	680
Dec.	....	1,715	...	627
Totals	....	13,982	...	7,387

Radio-Electronics-Television Mfrs. Assn.

	Shipments—Units		
	1957	1956	1955
Jan.	136,200	153,500	153,400
Feb.	149,100	178,400	186,500
Mar.	162,300*	181,900	218,100
Apr.	.....	161,400	183,200
May	.....	166,800	187,700
June	.....	169,500	204,000
July	.....	146,800	146,300
Aug.	.....	187,800	220,000
Sept.	.....	191,000	219,100
Oct.	.....	202,900	210,300
Nov.	.....	146,900	184,400
Dec.	.....	125,100	153,600
Totals	.....	2,012,000	2,266,600

*Preliminary.
Gas Appliance Mfrs. Assn.

tion of an increase in the second quarter. Taken at the end of the first quarter, it also revealed that these businessmen expect even more squeeze on their profits. Only 36 per cent expect them to rise in the third quarter.

Freight Car Orders Top '56

Orders for new freight cars are running well ahead of the 1956 pace, reports the American Railway Car Institute. Through March, they averaged 5584, compared with the 1956 average of 3483 (see chart, page 140). Deliveries are running at the highest average—8416 a month—since 1948, when the figure was 9387. The backlog has been reduced only 29,362 units in the last year.

Trends Fore and Aft

• Sales of the San Francisco bay area electronics industry are expected to soar 42.2 per cent in 1957 over 1956's. An informal survey at the Western Electronics Show & Convention also shows that the number of employees in the industry is expected to increase 33 per cent this year.

• The demands of metalworking companies on the money market are decreasing. From Dec. 26, 1956, to Apr. 10, 1957, commercial and industrial loans to metal and metal products companies increased $596 million. During the similar period a year earlier, the increase was $877 million.

• Although the peak has passed in pipeline building, Dresser Industries Inc. expects its sales of heavy machinery for the oil and gas industry to continue expanding. "The industry is attempting to increase the load on the existing pipeline system. This means many more pumping stations and loop systems, where our products are used," says R. E. Reimer, vice president. Dresser's backlog on Mar. 1 was $88.6 million, up 25 per cent from Nov. 1.

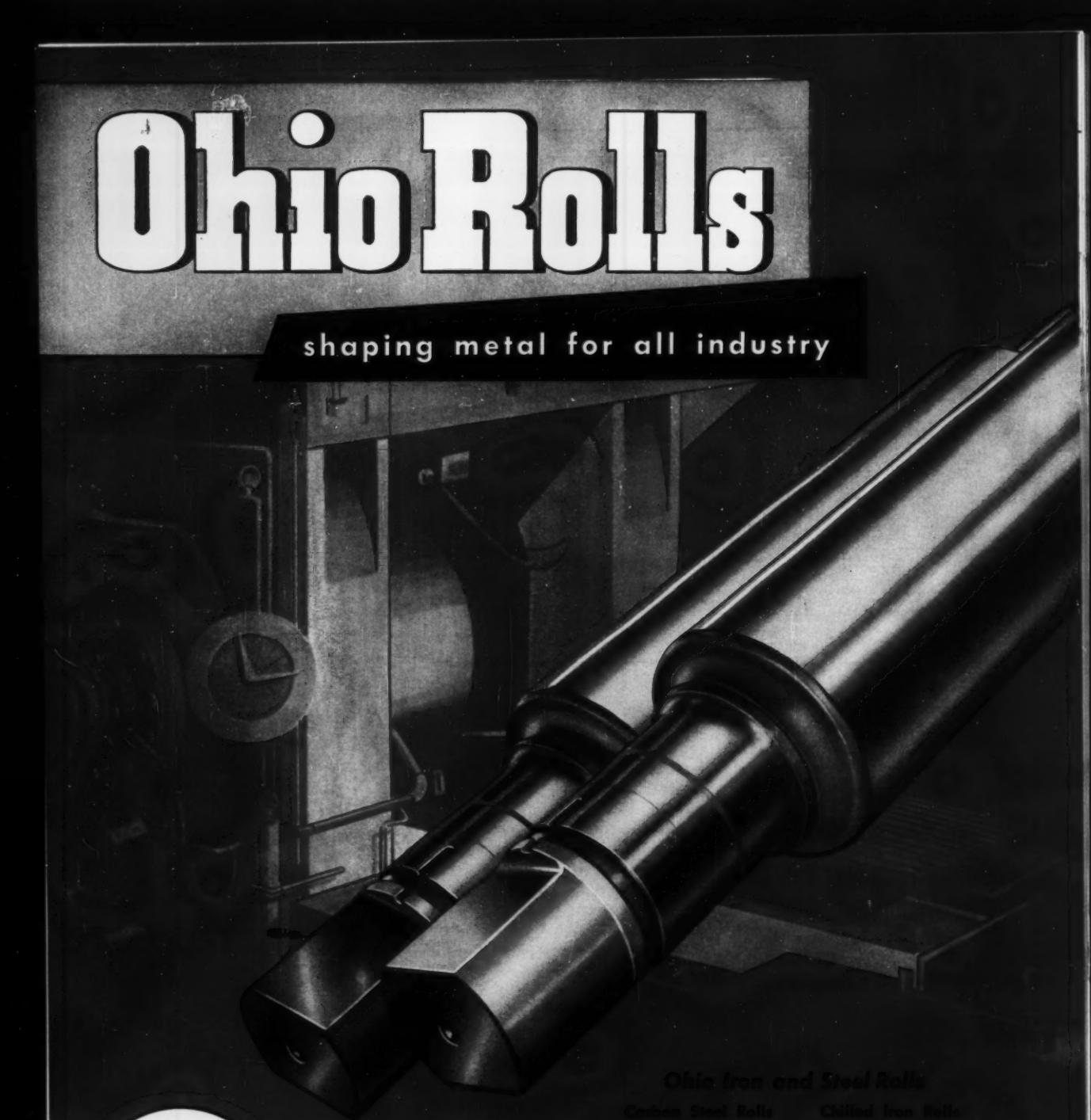
• New incorporations in March gained 9.5 per cent over the February level. At 11,815, they were 7.9 per cent below the March, 1956, figure. The first quarter total is 35,993, compared with last year's record of 38,688.

• The electronics industry established a record with factory sales of $5.9 billion last year, according to the *Electronics Industry Fact Book* published by Radio-Electronics-Television Manufacturers Association.

COOLIDGE
Balls
CHROME ALLOY AND STAINLESS
COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls

shaping metal for all industry



Ohio Iron and Steel Rolls

Carbon Steel Rolls	Chilled Iron Rolls
Ohioloy Rolls	Dense Iron Rolls
Ohioloy "S" Rolls	Nickel Grain Rolls
Pinion Rolls	Special Iron Rolls
Double-Pour Rolls	Nioloy Rolls
Forged Steel Rolls	

OUR 50th YEAR
1907
1957

THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO

Plants at Lima and Springfield, Ohio

JAMES BETTS SMITH
Alloy Precision Castings post

ARTHUR S. NIPPES
Henry Disston v. p.

JACK L. HINDES
Columbus Bolt sales dir.

JAMES K. WINGARD
Bliss engineering post

James Betts Smith was made chief engineer of **Alloy Precision Castings Co.**, Cleveland.

Arthur S. Nippes was named vice president and general manager, **Henry Disston Division**, H. K. Porter Company Inc., Philadelphia. He was assistant general manager-manufacturing.

George T. Long was named director of marketing and **William A. Lake**, sales manager for the unitary equipment division of **Carrier Corp.**, Syracuse, N. Y. **John M. Bickel** has retired as vice president of Carrier and general sales manager of the division.

Frank J. Foley was elected vice president, **United Screw & Bolt Corp.**, Cleveland. He continues to serve as secretary.

John G. Wynn was named executive staff assistant, general products headquarters, **Westinghouse Electric Corp.**, Pittsburgh. He succeeds **John C. Feick Jr.**, named assistant to the vice president, air conditioning division, Staunton, Va.

Paul R. Welch joined **McCulloch Motors Corp.**, Los Angeles, as works manager. He was plant manager of William R. Whittaker Ltd., Lynwood, Calif.

Ellsworth H. Sherwood was elected vice president, international division, **National Malleable & Steel Castings Co.**, Cleveland. **Lawrence A. Pomeroy Jr.** was made assistant manager of the division.

Jack L. Hindes was made director of sales; **Eugene F. Hamilton**, manager of customer service for **Columbus Bolt & Forging Co.**, Columbus, O.

Philip A. Sprague was elected president; **Donald R. Schoen**, executive vice president of **Hays Corp.**, Michigan City, Ind.

E. M. Richardson fills the new post of general sales manager, refractories division, **H. K. Porter Company Inc.**, St. Louis.

W. G. Troy was promoted from purchasing agent to director of purchases at **Michigan Seamless Tube Co.**, South Lyon, Mich.

George M. Keen was made manager, sprinkler department, power piping and sprinkler division, **Blaw-Knox Co.**, Pittsburgh. He succeeds **Harry W. Greenberg**, retired.

William B. Thomas, manager of **Kaiser Aluminum & Chemical Corp.'s** Dolton, Ill., extrusion plant, was named administrative manager of extrusion operations. He will have headquarters at the Newark, O., plant. **Raymond C. Hogan** succeeds Mr. Thomas.

I. E. Boberg, chief engineer, **Chicago Bridge & Iron Co.**, Chicago, was elected a vice president. **Leo J. Marcoux** was elected secretary.

William A. Merriman was made manager of casting sales for **Erie Forge & Steel Corp.**, Erie, Pa. He was on the sales engineering staff of Pittsburgh Steel Foundry.

James K. Wingard was made manager of engineering, press division, **E. W. Bliss Co.**, Canton, O. He was assistant chief engineer, rolling mill division.

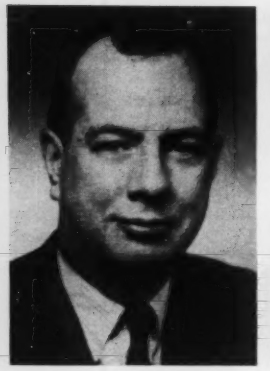
Elmer T. Gustafson was appointed vice president and general sales manager, **Ceco Steel Products Corp.**, Chicago. He replaces **Harold D. Jolley** as general sales manager. Mr. Jolley remains as senior vice president with special assignments. **George R. Wernisch**, eastern regional manager, was appointed vice president in charge of the structural products division, replacing Mr. Gustafson.

T. M. Hunter was appointed assistant to vice president-operations, **United States Steel Corp.**, Pittsburgh. **A. T. Duff** succeeds Mr. Hunter as general superintendent, Irvin Works, and is replaced by **G. P. Carson** as assistant general superintendent.

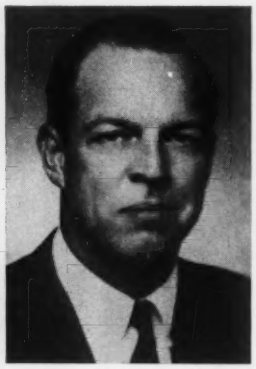
Carl P. Cronk joined **National Electric Products Corp.**, Pittsburgh, as director of marketing research. He was manager of sales planning and research for Cleveland Graphite Bronze Co.

E. P. Hansen was promoted to assistant chief engineer of **Allis-Chalmers Mfg. Co.'s** steam turbine department, succeeding **H. D. Emmert**, recently named chief engineer. **Cecil H. Morris** succeeds Mr. Hansen as engineer in charge of steam turbine mechanical design.

H. Follett Hodgkins Jr. was made



FRANK B. NEWBERT



THOMAS W. RUSSELL JR.

American Brake Shoe appointments

RICHARD G. WALL

ALBERT J. REICHERS

Cooper Alloy plant managers

assistant general manager of **Rollway Bearing Co.**, Syracuse, N. Y.

American Brake Shoe Co., New York, appointed **Frank B. Newbert** general purchasing agent. Formerly assistant general purchasing agent, he succeeds **Thomas W. Russell Jr.** who was elected vice president.

Forbes Steel Corp., Canonsburg, Pa., appointed **W. M. Jensen** general sales manager.

Henry Larsen was made assistant general works manager, tractor group, **Allis-Chalmers Mfg. Co.**, Milwaukee. He succeeds **Owen J. Higgins**, recently made general manager of the Harvey, Ill., works.

David Schlosser was named quality control manager, Pacific division, **Bendix Aviation Corp.**, with offices in Burbank, Calif.

At **Youngstown Sheet & Tube Co.'s** new seamless tube mill, Indiana Harbor Works, East Chicago, Ind., **Arthur C. Madden** was made superintendent; **Walter L. Scott Jr.**, an assistant. The mill is scheduled for production this fall.

Robert L. Wells was named manager of **Westinghouse Electric Corp.'s** atomic power department, Pittsburgh. He was executive assistant to the vice president in charge of the aviation gas turbine division, Kansas City, Mo.

Harold D. Prior was made technical director of **Chas. Taylor's Sons Co.**, Cincinnati, a subsidiary of National Lead Co.

Drummond R. Stuart was made general manager of **Black & Decker Mfg. Co. Ltd.**, Brockville, Ont., subsidiary of Black & Decker Mfg. Co.

Carl F. Graham was made director of research and development, **Turco Products Inc.**, Los Angeles.

Aro Equipment Corp. appointed **James A. Arney** division manager for southern Indiana and western Kentucky with headquarters in Indianapolis.

Richard G. Wall was made plant manager, stainless engineering and machine works division, **Cooper Alloy Corp.**, Hillside, N. J. He succeeds **Albert J. Reichers** who was made plant manager, aircraft products divisions, Clark, N. J.

Arthur N. Haar was made western regional sales manager-industrial sales, **Clark Bros. Co.** He is in Chicago.

Frederick G. Riedel was made chief engineer at **American Coils Co.**, Farmingdale, N. J.

Eugene D. Schunke was made manager of internal control for **Kelite Corp.**, Berkeley Heights, N. J.

Alan Moyer was made Milwaukee divisional sales manager, industrial sales, **Reynolds Metals Co.**

T. W. Gabriel and **S. J. Clokey** were elected vice presidents-commercial, **Jessop Steel Co.**, Washington, Pa. **F. W. Martin** was elected secretary-assistant treasurer. Mr. Gabriel and Mr. Clokey

ARTHUR C. MADDEN

WALTER L. SCOTT JR.

Youngstown Sheet & Tube positions

T. W. GABRIEL

S. J. CLOKEY

Jessop Steel vice presidents-commercial

Bike experts—like the one above—demand reliability . . . and that's where Alan Wood enters the sales picture.

The tubing in this Chain Bike Corporation product is formed from Alan Wood cold rolled sheet by Berger Machine Company. The sheet delivered by Alan Wood is of excellent quality, its reliability assured by Alan Wood's product control from ore to finished product. To this, add the services of Alan Wood metallurgists—always available to give the expert assistance that has helped solve hundreds of production problems for our customers.

To the tubing manufacturer, these contributions—consistent high quality of a basic material, and service—help assure efficient production runs, cut slowdowns and rejects. The bike manufacturer gets the selling advantage of a reliable material.

To the "no hands" bike expert this all adds up to "I'm gonna tell Jimmy to get a bike just like mine. It's rugged!"

Let Alan Wood cold rolled steel—and service—work to your advantage. For complete information write Marketing Div., Dept. CR-S70.

ALAN WOOD STEEL COMPANY

steelmasters for more than a century and a quarter • CONSHOHOCKEN, PA.

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia
New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati
Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul
San Francisco • Seattle

Montreal and Toronto, Canada—A. C. Leslie & Co., Limited

IRON PRODUCTS
"Swede" *pig iron*

STEEL PRODUCTS
Plates (sheared)
A.W. Dynalloy (high strength steel)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip

ROLLED STEEL FLOOR PLATE

A.W. ALGRIP
abrasive

A.W. SUPER DIAMOND *pattern*

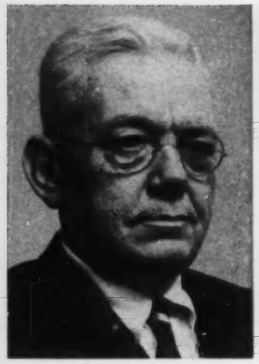
COAL CHEMICALS

A.W. CUT NAILS
Standard & Hardened

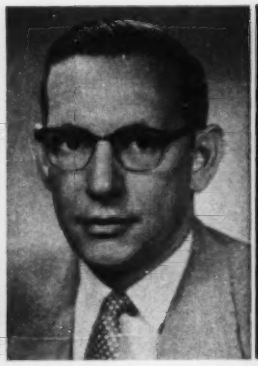
MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

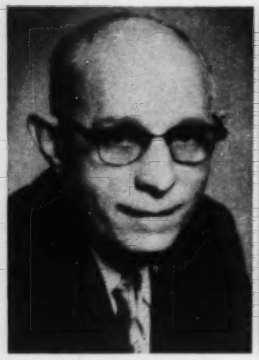


W. W. LUSK
United Eng. machinery sales



CHARLES B. BARTLETT
Allen Steel p. a.

JOHN F. BLACK
Selas steel mill sales



H. J. LOUTH
Ohio Crankshaft div. works

E. C. WILSON
Illinois Gear & Machine v. p.

HOWARD K. NORRIS
U. S. Rubber factory mgr.

were assistant vice presidents-sales.

H. J. Louth was named works manager, crankshaft and camshaft division, **Ohio Crankshaft Co.**, Cleveland. He became production superintendent in 1948 and in 1950 was named personnel director. He is succeeded as personnel director by **Ben M. Kozman Jr.**

E. C. Wilson was elected vice president, **Illinois Gear & Machine Co.**, Chicago.

Alan G. Caterson was made supervisor of commercial applications and sales promotion for **Rem-Cru Titanium Inc.**, Midland, Pa. **Jay J. Patten** was made supervisor of the forge shop.

William G. Parker was made sales manager of **Gary Steel Supply Co.**, Chicago.

Franklin S. Sullivan was made director, material handling division, **Fruehauf Trailer Co.**, Detroit. He succeeds **Edwin Avery**, resigned.

Howard K. Norris was made factory manager for the power transmission belt plant of **United States Rubber Co.** in the Tacony area of Philadelphia. He was assistant plant manager.

Lewis R. Darlin was named central regional manager, Dexion Division, **Acme Steel Co.**, Chicago. He was sales supervisor for the division at Cleveland and Pittsburgh.

Paul W. Brannon was named factory manager for the Chicago plant of **Brad Foote Gear Works Inc.** He was production manager.

R. K. Annis was made development engineer, **Fairbanks, Morse & Co.**, Chicago.

John H. Diehl, assistant works manager of Allis-Chalmers Mfg. Co.'s LaPorte, Ind., Works, was named assistant to the vice president in charge of the power tool division, **Rockwell Mfg. Co.** He will have headquarters temporarily at the Bellefontaine, O., plant before moving to Pittsburgh.

W. W. Lusk was made manager of machinery sales, **United Engineering & Foundry Co.**, Pittsburgh. He was a sales engineer.

Charles B. Bartlett, formerly with Chicago Bridge & Iron Co., was made treasurer and purchasing agent of **Allen Steel Co.** and its affiliated organizations, Steel Warehouse & Supply Co., and Building Specialties Corp., Salt Lake City, Utah. **William C. Howe Jr.** was made secretary and continues to serve as chief engineer.

John F. Black was made manager of sales-steel mill division, **Selas Corp. of America**, Dresher, Pa. Mr. Black was with Koppers Co. Inc., serving as assistant manager, Freyn Department.

Frank M. Mansfield III was named sales manager and vice president for **Wagner Bros. Inc.**, Detroit. He was manager of product planning and market research for General Electric Co.'s metallurgical products department.

Alexander Greenfield joined **Fischer & Porter Co.**, Hatboro, Pa., as director of research, development and engineering. Formerly with Daystrom Instrument Division, Daystrom Inc., in a similar post, he succeeds **Nathaniel Brewer** who now will operate on a policy-making level as vice president in charge of technology and chairman of the executive committee.

OBITUARIES...

G. Donald Spackman, 61, vice president-operations at **Lukens Steel Co.**, Coatesville, Pa., died Apr. 14.

William J. Murphy, vice president, **Ferry Cap & Set Screw Co.**, Cleveland, died Apr. 10.

Gerald E. Felber, 55, assistant purchasing agent, **Wickwire Spencer Steel Division**, Colorado Fuel & Iron Corp., Buffalo, died Apr. 15.

C. C. Morin, 73, president, **Frost Steel & Wire Co. Ltd.**, Hamilton, Ont., died Apr. 14.

Harry W. Smith, 67, assistant to the president, **Isaacson Iron Works**, Seattle, died Apr. 6.

making history or moving mountains...

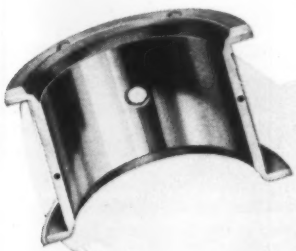
BOHN parts . . . always dependable

Photo Courtesy Warner Brothers' "*Spirit of St. Louis*"

1927 Solo . . . New York to Paris . . . 33½ hours . . . non-stop. Lindbergh's epic achievement focused world attention on an infant industry . . . and aviation surged into a new era of progress.

BOHN BEARINGS, in the 225 H.P., 9 cylinder engine, functioned unfailingly throughout this history making flight.

1957 Today, 30 years later, Bohn still makes dependable bearings . . . still pioneers in the development of better parts for all industry. This mammoth crawler tractor moves mountains . . . does the *big jobs easily*. Bohn *aluminum-on-steel bearings* and *heavy-duty aluminum pistons* are vital parts of the 320 H.P., diesel engine powering this 30-ton giant.



Bohn Aluminum-On-Steel Bearings . . .
available in a wide range of thicknesses. Recommended for light or heavy-duty applications. High fatigue resistance, handle loads up to 10,000 psi. Non-corrosive, usable with all types of shafts.

Bohn Heavy-Duty Aluminum Pistons . . .
give positive bond with iron or nickel alloy inserts. Improve engine performance by eliminating top ring-groove wear and reducing oil consumption.

BOHN

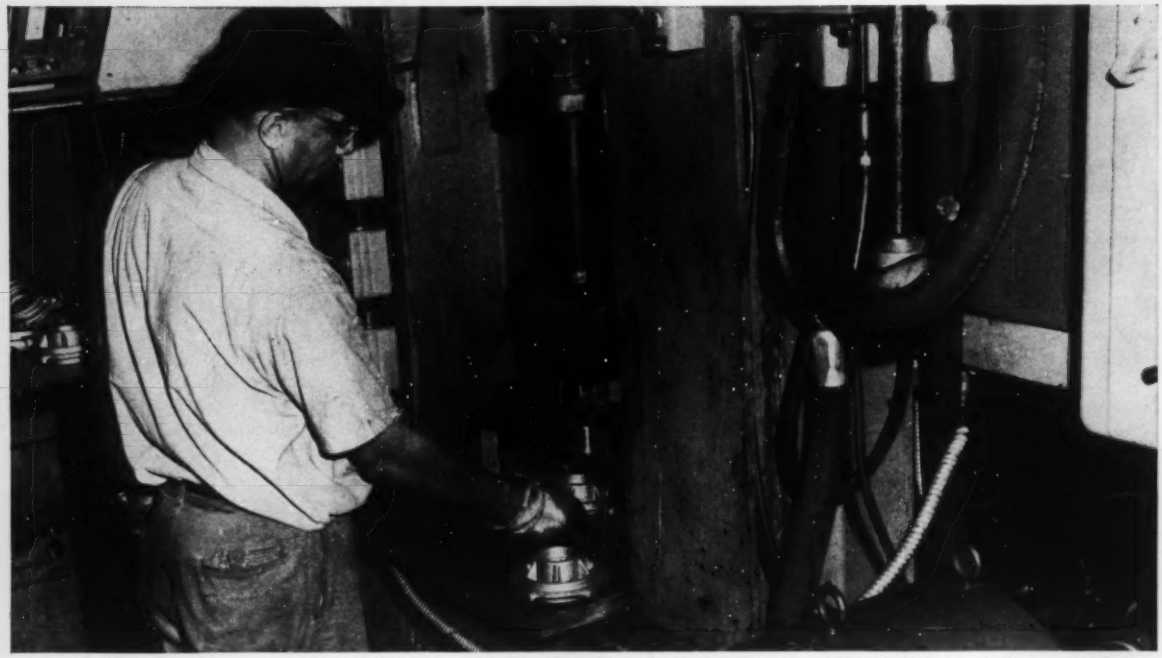
WRITE OR CALL YOUR NEAREST BOHN OFFICE

SALES OFFICES: *Boston • Chicago • Cleveland • Dayton • Detroit • Indianapolis Milwaukee • Minneapolis • Moline • New York • Philadelphia • Rochester • St. Louis*

ALUMINUM AND BRASS CORPORATION

DETROIT 26, MICHIGAN

CASTINGS • FORGINGS • EXTRUSIONS • PISTONS • BEARINGS • BRASS ROD • BRASS AND BRONZE INGOTS • REFRIGERATION AND AIR CONDITIONING PRODUCTS



One and one-quarter inch hydraulic lines on this 45-ton shear press are Aeroquip 1509 High Pressure Hose.

Aeroquip Flexible Hose Lines Resist Heat, Vibration and Abrasion on Plant Equipment

Albion Malleable Iron Company Uses Aeroquip on Many Types of Equipment

At Albion Malleable Iron Company, Albion, Michigan, Aeroquip Hose Lines are used for hydraulic and other fluid lines on lift trucks and plant machinery—including coremaking, molding, melting, heat treating and finishing equipment.

According to Finishing Superintendent Ernie Sandelius: "Aeroquip has our approval because it resists heat, vibration, abrasion and other operating stresses better than anything we've used."

Find out how these durable, dependable Aeroquip Flexible Hose Lines can help keep your equipment working, save you maintenance headaches. Your Aeroquip Distributor listed in the Yellow Page Phone Directory can give you the complete Aeroquip story. Call him, or write us.

Replacement hose lines are assembled in the shop, using Aeroquip Bulk Hose and Detachable, Reusable Fittings.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 10, ONTARIO

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

Plans Conduit Plant

Circle Wire & Cable's new facility in New York will turn out millions of feet of tubing

A $3-MILLION electrical metallic tubing plant is being built by Circle Wire & Cable Corp., a wholly owned subsidiary of Cerro de Pasco Corp., New York. The new facility will occupy 60,000 sq ft at the site of Circle's Hicksville, N. Y., copper rolling and steel flattening plant. It will bring the total area covered by the Hicksville installations close to 200,000 sq ft.

Production of tubing will be fully automatic. The plant will have a capacity of millions of feet of tubing a year and is scheduled to be in operation by the end of November.

Thin Wall Conduit — Electrical metallic tubing, known in the trade as thin wall conduit, is widely used in electrical installations for industrial and residential building. The thin steel tubing is used as housing for electrical wires and cables.

Circle maintains general offices and has plant facilities at Maspeth, Long Island. It was acquired by Cerro de Pasco in 1955 in a move which represented the initial entry by the Cerro organization into the U.S. fabricating industry. Before that, Cerro de Pasco had confined its operations substantially to the mining, smelting and refining of nonferrous metals in Peru.

Scovill Mfg. Improves Mills

Scovill Mfg. Co., Waterbury, Conn., awarded a contract to Dravo Corp., Pittsburgh, for two coolant circulating systems to be installed on a brass and aluminum Sendzimir rolling mill.

Fansteel Enlarges Facilities

Fansteel Metallurgical Corp., North Chicago, Ill., is expanding its facilities at an estimated cost of $665,500. A third story will be added to its metallurgical building to house research facilities.

The space vacated by the research department will be used to expand the production facilities of the Metals Fabrication and Metals & Chemicals divisions. A new building, containing 21,500 sq ft, will be built for production of sintered powder metallurgy products.

Adds Titanium Testing Service

A new facility for testing titanium and its alloys has been added to the services of Bowser-Morner Testing Laboratories Inc., Dayton, O.

Forger Equips Plant Addition

J. H. Williams & Co., Buffalo, makers of forgings, tools and similar products, has ordered more than $1 million worth of machinery to be installed in a 30,000 sq-ft plant addition.

Parker Appliance Expanding

Parker Appliance Co., Cleveland, is spending $2,250,000 for capital improvements and expansion this year. The expenditure includes acquisition of Franklin C. Wolfe Co., Culver City, Calif., and Mathewson Corp., Los Angeles; an addition to the Berea, Ky., plant of the company's Rubber Products Division; and various new machinery and equipment for operations throughout the company.

Changes Name to Mirro Mfg. Co.

Aluminum Goods Mfg. Co., Manitowoc, Wis., changed its name to Mirro Mfg. Co.

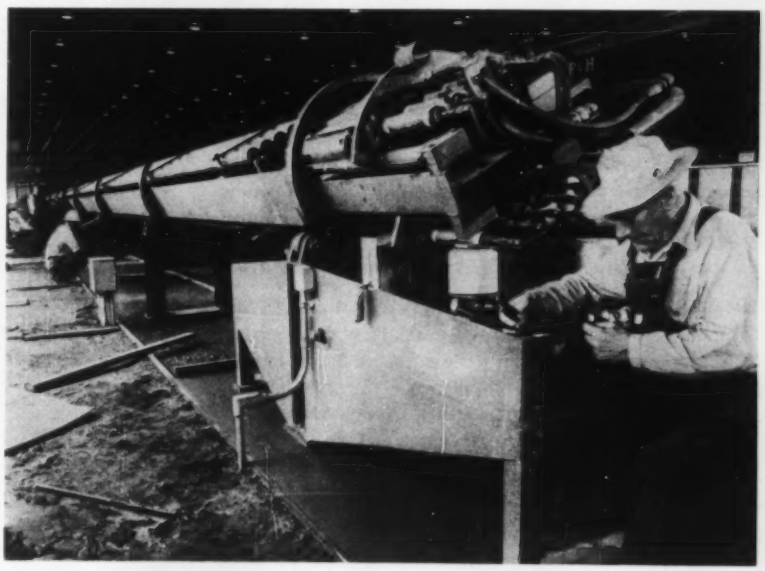
Will Build Pattern Plant

Modern Pattern & Plastics Inc., manufacturer of wood and metal patterns, will build a new plant in Toledo, O. It'll have 25,000 sq ft of space.

Kaiser Orders Coke Ovens

Kaiser Engineers awarded Koppers Co. Inc., Pittsburgh, a contract to design and build two coke oven batteries and to make extensions to the coal chemical plant at Kaiser Steel Corp.'s Fontana, Calif., operations. Each battery will consist of 45 Koppers-Becker gas gun type ovens and will have a combined capacity for carbonizing 1850 tons of coal a day. When completed, Kaiser's Fontana plant will have seven batteries,

(*Please turn to page* 152)



American Brass Gets Ready for Big Drawing in West

Workmen at American Brass Co.'s 333,000 sq-ft mill at Paramount, Calif., make adjustments on a 36,000-lb, quintuple-die copper tube draw bench. This machine will produce five 125-ft tubes at a time. The $15-million mill is scheduled to be in partial production this fall, in full production the first quarter of 1958. Annual capacity is estimated at 30 million lb of copper and copper-base alloys in the form of sheet, strip, tube, rod, wire, drawn products

Know a better name than "Spade"?

(It certainly isn't "Heavy-Duty, Super-Powered, Raised-in-the-Sand Trowel"!)

Same goes for lathes! Why call a lathe a 16″ machine, when it may swing 18½″ over the bed and only 12½″ over the cross slide—more or less? Especially when most lathe types are used largely for between center work? Monarch is proud to be a part of the Lathe Group that has performed a real service to lathe buyers by proposing the commonsense, informative four-digit designation system. And *we're* going even further. Henceforth every Monarch model designation on new lathes will give you a complete description at a glance!

The Four-Digit System

This is simplicity itself. The first two digits reveal swing or clearance over bed and carriage wings. Second two digits, swing over cross slide on the basic machine. A reference to the chart shows how immediately informative this is.

Raising—and Heavy Duty Information

Now, you know where you stand with Monarch—as in contrast with such practices as calling a basic 20″ machine a 20″ heavy duty, then raising it to 25″ and calling the raised model a 25″ standard.

All Monarch lathes designated "Heavy Duty" are engineered heavy duty machines—and the specifications reveal the weight, power, and capacity to justify the term. Where engineered raises in the sand are involved, the basic designation will be used, followed by a dash and the raised clearance. For example, the first raise of our Model 4025 Heavy Duty will be expressed as Model 4025-31 Heavy Duty. Simple! Clear! Understandable! Factual!

The "Engine" vs "Toolmaker's" Doubletalk

The fact that these terms still exist at all is a tribute to the force of habit. For years, we've only made one grade of lathe—the best within our power. Every machine has the utmost in built-in precision and production because the close manufacturing limits of today are equal to and often surpass the toolroom limits of yesterday, while high labor rates make it essential that toolroom operations be placed on the highest possible productive basis. It is true that a lathe for toolroom use must, as a rule, have more flexibility than one for manufacturing purposes. So, on many models, we furnish a standard complement of additional equipment. Machines with such equipment differences are designated with the suffix "T". Model 1610 becomes Model 1610-T. As for the word "Engine" applied to a lathe, it lost meaning years ago. Let's bury it!

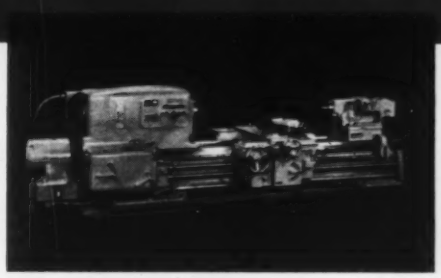
In a Nutshell...

Now you know how to appraise the swing capacity of every Monarch Lathe at a glance. We hope the day will come soon when the same nomenclature will apply to all lathes made. Then nobody will have to dig for the facts—The Monarch Machine Tool Company, Sidney, Ohio.

SIZE DESIGNATIONS

Machine	New Four-Digit System	Outmoded Size Designations
Series 62 Preselector Dyna-Shift	1610	13″ Engine
	1610-13	13″ Raised Engine
	2013	16″ Engine
	2013-16	16″ Raised Engine
	2516	20″ Engine
	2516-19	20″ Raised Engine
Series 80 Heavy Duty Dyna-Shift	2516	20″ Heavy Duty Engine
	2516-20	20″ Heavy Duty Raised Engine
	3220	25″ Heavy Duty Engine
	3220-24	25″ Heavy Duty Raised Engine
	3220-28	25″ Heavy Duty Raised Engine
Series 90 Heavy Duty Dyna-Shift	4025	32″ Heavy Duty Engine
	4025-31	32″ Heavy Duty Raised Engine
	4025-36	32″ Heavy Duty Raised Engine

NOTE—Older models, namely Model EE Manufacturing and Toolmaker's, Series EE-Model 1000, Series 61 Engine and Toolmaker's Lathes and Models M, N, and NN Heavy Duty Engine Lathes will retain old designations because of long-established user acceptance. The suffix "T" after the following model designations denotes inclusion of additional equipment usually required for toolroom use—1610, 1610-13, 2013, 2013-16, 2516, 2516-19.



For Example:

Monarch Series 90 Heavy Duty Dyna-Shift—Model 4025-31
Basic Clearance over Bed and Carriage Wings—40″
Basic Swing over Cross Slide—25″
Raised Swing over Cross Slide—31″

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

PETERSON STEELS, INC.

Union, New Jersey • Detroit, Michigan • Chicago, Illinois

(*Concluded from page* 149)

each consisting of 45 ovens. Their carbonizing capacity will be 6600 tons of coal a day.

Milford Rivet Boosts Output

An addition of over 10,000 sq ft of manufacturing space has been put into operation at the Aurora, Ill., facilities of Milford Rivet & Machine Co., Milford, Conn. High capacity, cold heading equipment has been installed, permitting production of steel parts in diameters up to 5/16-in. The expansion includes new machining, washing, finishing and inspection facilities.

Warehouse Enlarges Facilities

Edgcomb Steel of New England Inc., Milford, Conn., is enlarging its facilities. Upon completion of the plant addition, it will have about 75,000 sq ft of floor space. The firm is a distributor of carbon and stainless steels, brass and aluminum.

Will Make Bits in Canada

Fagersta Steelworks of Sweden will build a factory at Vancouver, B.C., for the production of tungsten-tipped carbide drilling bits.

Builds Bearing Plant in West

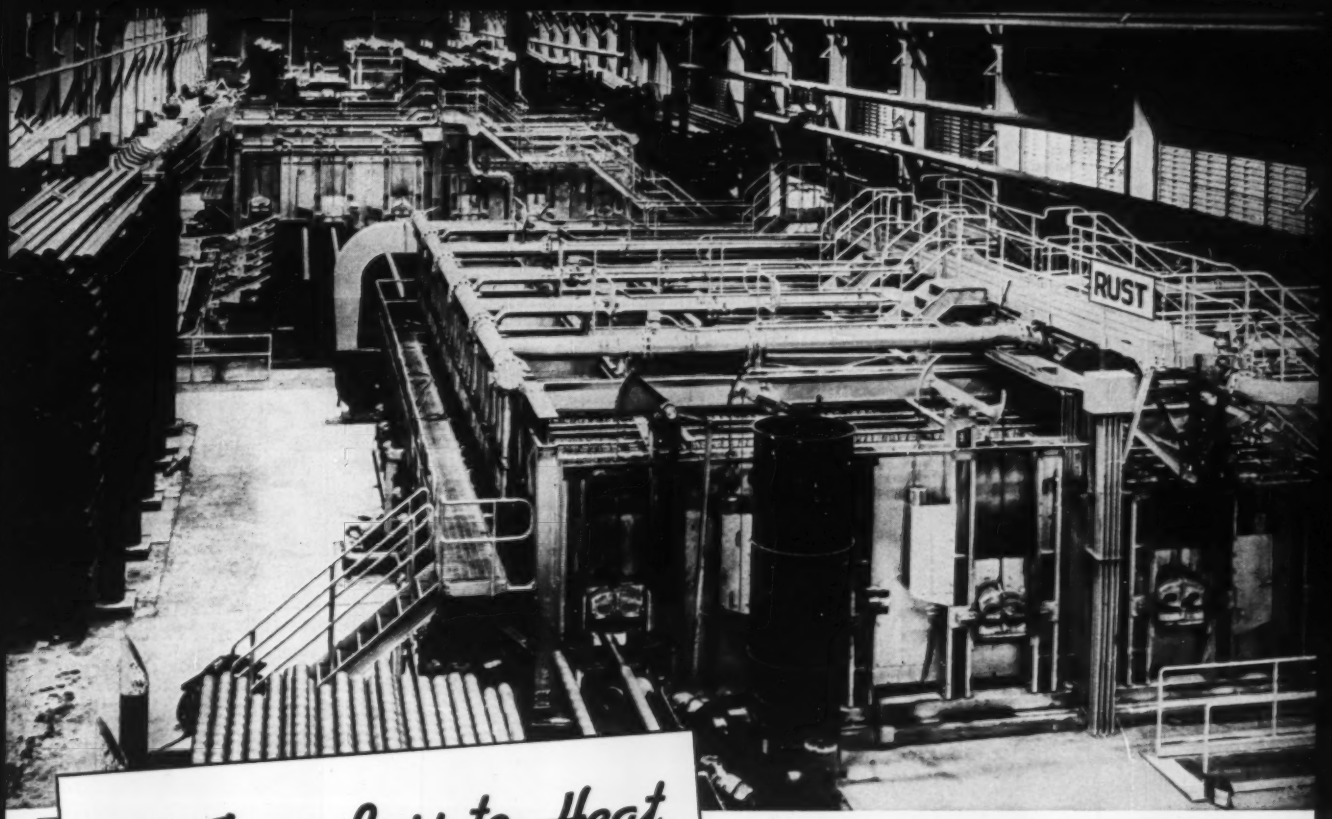
Industrial Tectonics Inc. has completed construction of bearing manufacturing facilities at 18301 Santa Fe Ave., Compton, Calif.

American Coils Opens Plant

American Coils Co. opened its plant in Farmingdale, N. J., doubling its productive capacity. The firm makes packaged air conditioners, heat pumps, water chillers and cooling towers for residential, industrial and commercial use.

Vesuvius Crucible Expanding

Vesuvius Crucible Co., Swissvale (Pittsburgh), Pa., has set aside about $125,000 for expansion of its manufacturing facilities this year. The firm makes graphitic refractories and graphite stopper heads used to control the pouring of steel from ladles. Ves-



116 Tons Less to Heat in this roof

because of B&W Insulating Firebrick suspended construction

Here's another case where light weight means lower cost. The roof of this walking beam furnace is 2,320 square feet. B&W Insulating Firebrick suspended construction for a 9-inch roof weighs about 30 lbs per square foot, including the weight of rods, hangers, pipe, brick and mortar. This is approximately 100 lbs per square foot less than an arch constructed of heavy firebrick plus insulation having the same heat flow. *This saving means the B&W IFB roof is 116 tons lighter.*

The new walking beam furnace (shown in photograph above) was designed and constructed by Rust Furnace Company for Jones & Laughlin Steel Corporation. Seamless pipe is conveyed into the furnace, moves slowly from left to right on walking beam rails designed and furnished by York-Gillespie Mfg. Co., and passes out the exit door.

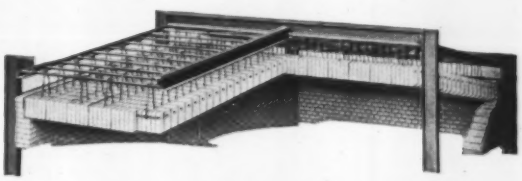
Here are the money-saving benefits of B&W suspended construction:

1. Supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special castings.

2. B&W Insulating Firebrick heat up and cool down faster. This means lower fuel costs, faster inspection.

3. Furnace temperatures can be changed quickly. When different steels call for different heating schedules, the furnace temperature can be adjusted in minutes instead of hours.

4. Installation costs are lower because these lightweight brick can be handled faster and easier than ordinary heavy firebrick.



This is a cross-sectional drawing of a typical suspended arch arrangement using B&W Insulating Firebrick. It can be used in flat or sloping roofs, nose arches and many other types of suspended furnace construction.

For complete information on B&W IFB—the *lightest* weight insulating firebrick, write to B&W today or call your local Refractories Engineer.

BABCOCK & WILCOX

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REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
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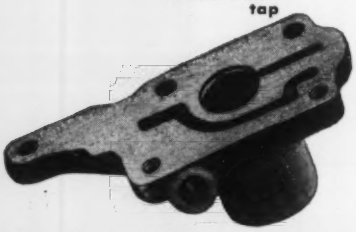
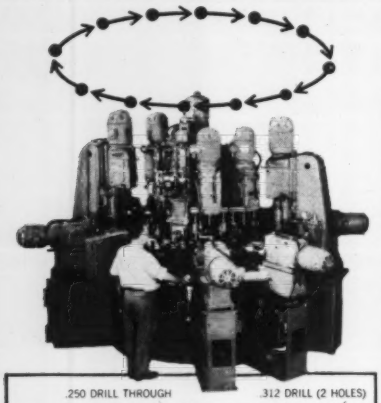
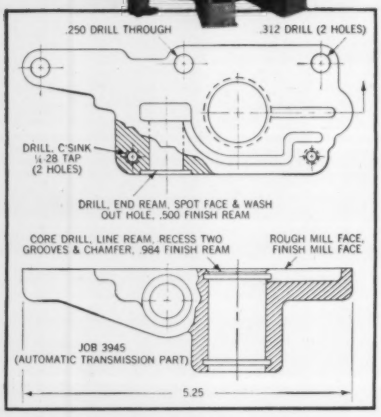


200 PER HOUR GROSS





This Kingsbury has a central column and 12 stations, and 13 automatic operating units. Clamping and unclamping are automatic. All units operate at the same time, while the operator is changing parts in the fixture.

Most Kingsburys are less elaborate. But all have the same purpose:

uniform operations
at a high production rate
to the customer's specification
at low unit cost

May we get together on one of your jobs, simple or complex? Kingsbury Machine Tool Corporation, Keene, N. H.

KINGSBURY

INDEXING AUTOMATICS for high production drilling and tapping

uvius also serves the nonferrous foundry industry as a manufacturer of graphitic and silicon carbide crucibles and refractory shapes.

Enters Aluminum Billet Field

Jersey Billets Inc. has started production at its plant in South Amboy, N. J. Monthly capacity is 4 million lb of aluminum billets. The new firm is a subsidiary of Aluminum Billets Inc., Youngstown.

Allen Mfg. Building Plant

Allen Mfg. Co., maker of socket screw and hex wrenches, is building a 270,000 sq-ft plant and main office building in Bloomington, Conn.

Ford Expanding Windsor Plant

Ford Co. of Canada will spend $21,460,000 on plant expansion and equipment at Windsor, Ont. John W. McIntyre, assistant general manager, says the program will include plant additions, new equipment and tooling. A complete change-over is being made in the engine plant.

Reliance Steel Opens Branch

Reliance Steel Products Co., McKeesport, Pa., opened a district office at 250 E. 43rd St., New York. John Karboska is district manager.

Aeronca Enlarges Facilities

Aeronca Mfg. Corp., Middletown, O., will construct a 50,000 sq-ft plant addition and a new 10,000 sq-ft office building in that city. Production capacity will be increased about 20 per cent.

Warehouse Triples Capacity

Empire Steel Corp. of Denver has completed an expansion program which included installation of several overhead cranes. This steel warehouse has doubled its size and tripled its capacity in two years of operation in Denver. Mike R. Rubala is in charge of the operational phase of the business.

GE Modernizing and Expanding Five Foundries

GENERAL ELECTRIC Co., Schenectady, N. Y., plans to spend some $1.6 million this year for the expansion and modernization of its foundries at Everett and Lynn, Mass.; Schenectady and Elmira, N. Y.; and Erie, Pa.

Schenectady — Some $941,000 will be invested in the Schenectady area, including about $451,000 to complete construction of the applied research and development laboratory and furnish it with testing facilities. More than $182,000 will be used to set up a specialty casting foundry. A 60 x 100 ft extension to the steel foundry costing $115,000 will increase production capacity and facilitate the cleaning and shipping of large castings. Two oil-fired annealing furnaces (costing nearly $80,000) will be installed in the steel foundry. New flasks for the iron and steel foundries will be purchased ($35,000); and about $65,000 will be expended on modernization and improvement projects in these two foundries, the department office building, pattern shop and storage areas.

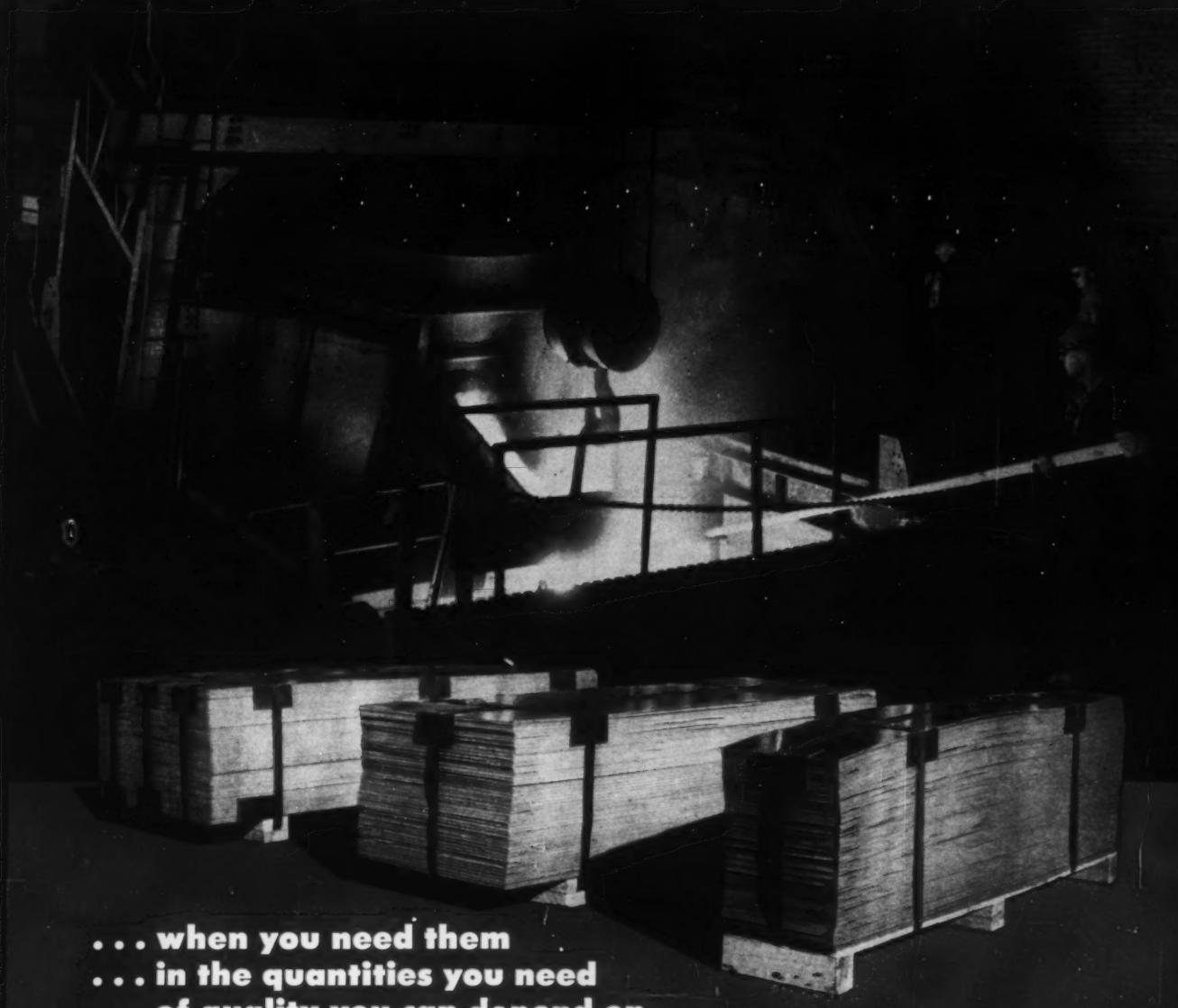
Elmira—At Elmira, a new mechanical molding operation and improvements to production methods will cost some $275,000. Improvements also will be made in the pouring equipment, and the pattern shop will be enlarged.

New England—At the Everett steel foundry, some $165,000 has been allotted to increase production facilities, including installation of a new annealing furnace and relocation of the shipping operation to expand the molding operation. Some $175,000 will be expended for the modernization and improvement of various molding, casting and auxiliary machinery in the Lynn and Everett foundries.

Erie—An expenditure of $46,000 will be made in the Erie malleable foundry for the modernization and improvement of facilities.

E. R. Oeschger, general manager of GE's Foundry Department, points out that the $1.6 million being invested in his department this year is part of GE's planned expenditure of $500 million on capital expansion for 1956-1958.

SPECIAL STEELS*



. . . when you need them
. . . in the quantities you need
. . . of quality you can depend on

from centrally located **Ingersoll Steel**

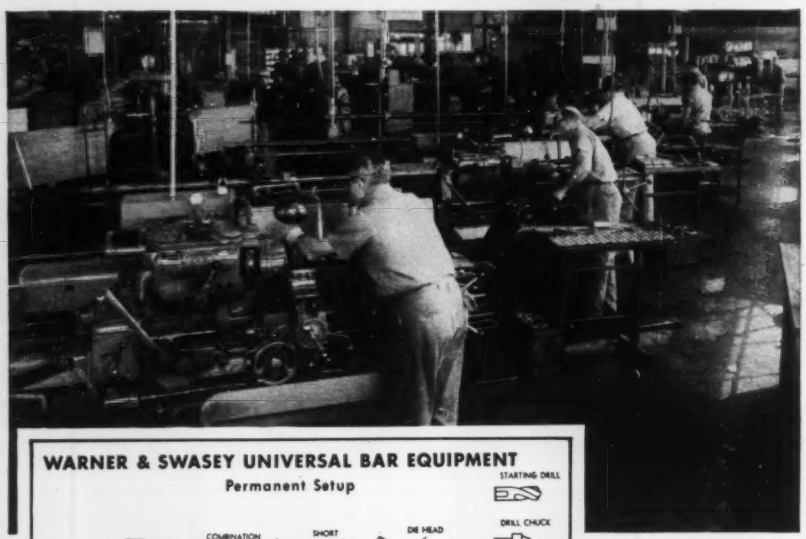
When service counts, you can count on Ingersoll for a wide variety of special purpose steels.* Being a specialty mill, Ingersoll offers great flexibility in production scheduling, set up to fit your own requirements. Ingersoll's advantageous location at New Castle, Indiana assures prompt deliveries. And Ingersoll's modern quality-control facilities mean dependably uniform high quality from one order to the next. On all these counts, it will profit you to consult Ingersoll—a good name to know, a good place to go for the special steels you need.

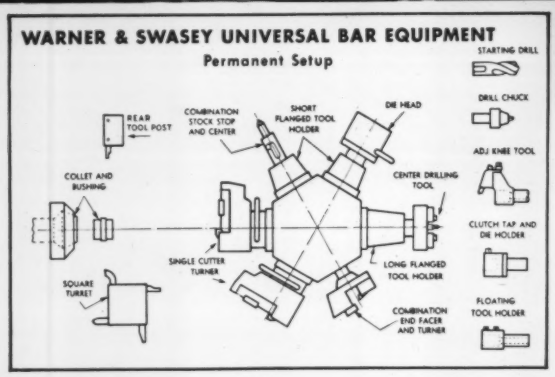
* stainless steels • heat resisting steels • Ingalsled stainless-clad sheets alloy steels • forging quality electric steel ingots • automotive clutch plate steels • Tom-Cross cross-rolled steel • carbon electric steel for tractor clutch discs • knife steels • saw steels • high speed hack saw steels • soft center and other agricultural steels • special analysis steels

INGERSOLL STEEL B-W BORG-WARNER

Ingersoll STEEL DIVISION
Borg-Warner Corporation
New Castle, Indiana

Here's a real case of
SMALL LOT PRODUCTION
on No. 3 turret lathes at CAMCO, Inc.





Warner & Swasey Standard Tools are quickly interchangeable for simple or complex jobs—in large or small lots—thus minimizing your tooling costs.

CAMCO MACHINES A WIDE VARIETY OF PARTS LIKE THESE IN 6 TO 100 PIECE LOTS

CAMCO, INC., Houston, Texas, depends on Warner & Swaseys for small lot production of parts for their gas lift valves—equipment which lifts petroleum from oil wells whose natural forces are exhausted.

Two of these nine Warner & Swaseys are standard tooled No. 3 turret lathes which machine a wide variety of simple to complex parts from stainless steel and monel metal, in lots averaging 50 pieces. Tolerances as low as .002 are held on most jobs.

One of the No. 3's is also equipped with a full length lead screw and selective gear box to machine numerous small lot threading jobs. The threads are chased with the lead screw and an automatic knock-off attachment. Specification of the threads: standard vee or round form, special diameter, standard pitches, Class 3.

Since the day the first No. 3 machine was installed in 1954, working two 9-hour shifts per day, not one hour has been lost because of downtime for repairs! Similar performance has been achieved by their other Warner & Swaseys—No. 4 and No. 5 turret lathes, 2-A and 4-A heavy duty turret lathes, and two 5-spindle automatics.

This story again illustrates a point recognized in our customers' plants throughout the world—for dependable day-after-day production of small lots, you can't beat the versatility and accuracy of standard tooled Warner & Swasey Machine Tools!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

CONSOLIDATIONS

Tecumseh Products Inc., Tecumseh, Mich., purchased **Power Products Corp.**, Grafton, Wis., subject to approval of stockholders. The price was more than $2.5 million.

White Sewing Machine Corp., Cleveland, purchased the **Boyer-Campbell Co.**, Detroit, distributor of industrial mill supplies and safety equipment. The name and operating management will be retained by White.

Rome Cable Corp., Rome, N. Y., purchased **T. J. Cope Inc.**, Collegeville, Pa., manufacturer of special products for the electrical industry. Allen M. Ziegler will continue to manage the Cope operations.

Mueller Industries Inc., Aurora, Ill., purchased **Badger Malleable & Mfg. Co.**, South Milwaukee, Wis., which will become its fifth operating division. Badger makes light and medium weight malleable castings and agricultural and railroad jacks. Mueller's other divisions are: Love Bros. Inc., Aurora; Midwestern Foundries Inc., Garrett, Ind.; Sterling Casting Corp., Bluffton, Ind.; and Pyott Foundry & Machine Co., Aurora.

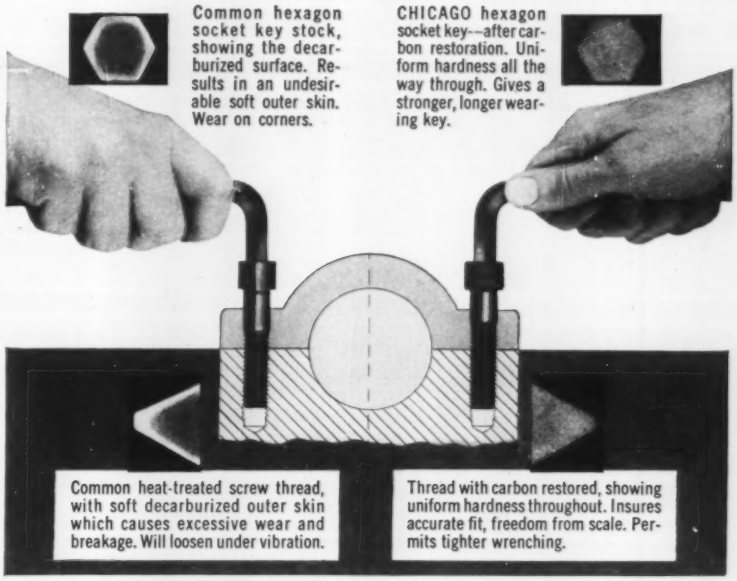
Weatherhead Co., Cleveland, purchased **Plew Tool Co. Inc.**, Columbia City, Ind., and will operate the company as Plew Tool Corp. The firm does custom heat treating and produces cutting and forming tools. Plans are being made to more than double the capacity of the Columbia City plant. Officers are: President, J. M. Baker; vice president and general manager, Roger Plew; secretary-treasurer, M. R. Funari.

Miehle-Goss-Dexter Inc., Chicago, purchased the **E. P. Lawson Co. Inc.**, New York, maker of paper cutting machinery and bindery equipment.

Siegler Corp., Chicago and Anaheim, Calif., purchased the **C & G Tool Co.**, Los Angeles, manufacturer of rotary planers. C & G will operate as part of Siegler's Consolidated Machinery & Supply Co.

(*Please turn to page* 160)

How carbon affects fastener performance

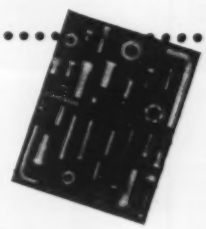

Common hexagon socket key stock, showing the decarburized surface. Results in an undesirable soft outer skin. Wear on corners.
CHICAGO hexagon socket key—after carbon restoration. Uniform hardness all the way through. Gives a stronger, longer wearing key.
Common heat-treated screw thread, with soft decarburized outer skin which causes excessive wear and breakage. Will loosen under vibration.
Thread with carbon restored, showing uniform hardness throughout. Insures accurate fit, freedom from scale. Permits tighter wrenching.

Screw fasteners may look identical, but the microscope reveals wide differences in their ability to "take it".

Steel hardness depends on the precise amount of carbon in its structure. But during steel manufacture this vital surface carbon is inevitably lost. Result (shown above) is a soft, decarburized outer skin in the finished fastener, causing thread stripping, fatigue failure, excessive wear, or loosening under vibration.

The soft "decarb" layer is eliminated by The Chicago Screw Company's unique "Carbon Restoration" process in which surface carbon is replaced during heat treating. The process is precisely controlled to give uniform hardness from core to surface.

All Chicago "Safety-Plus" Socket Screw Products and heat-treated cap screws have the benefit of *Carbon Restoration* plus complete quality control from start to finish. For full information and catalog, write our Standard Products Division.



CHICAGO SCREW COMPANY
2500 Washington Boulevard
Bellwood, Illinois

Please forward catalog information on Chicago standard fasteners

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Title_____

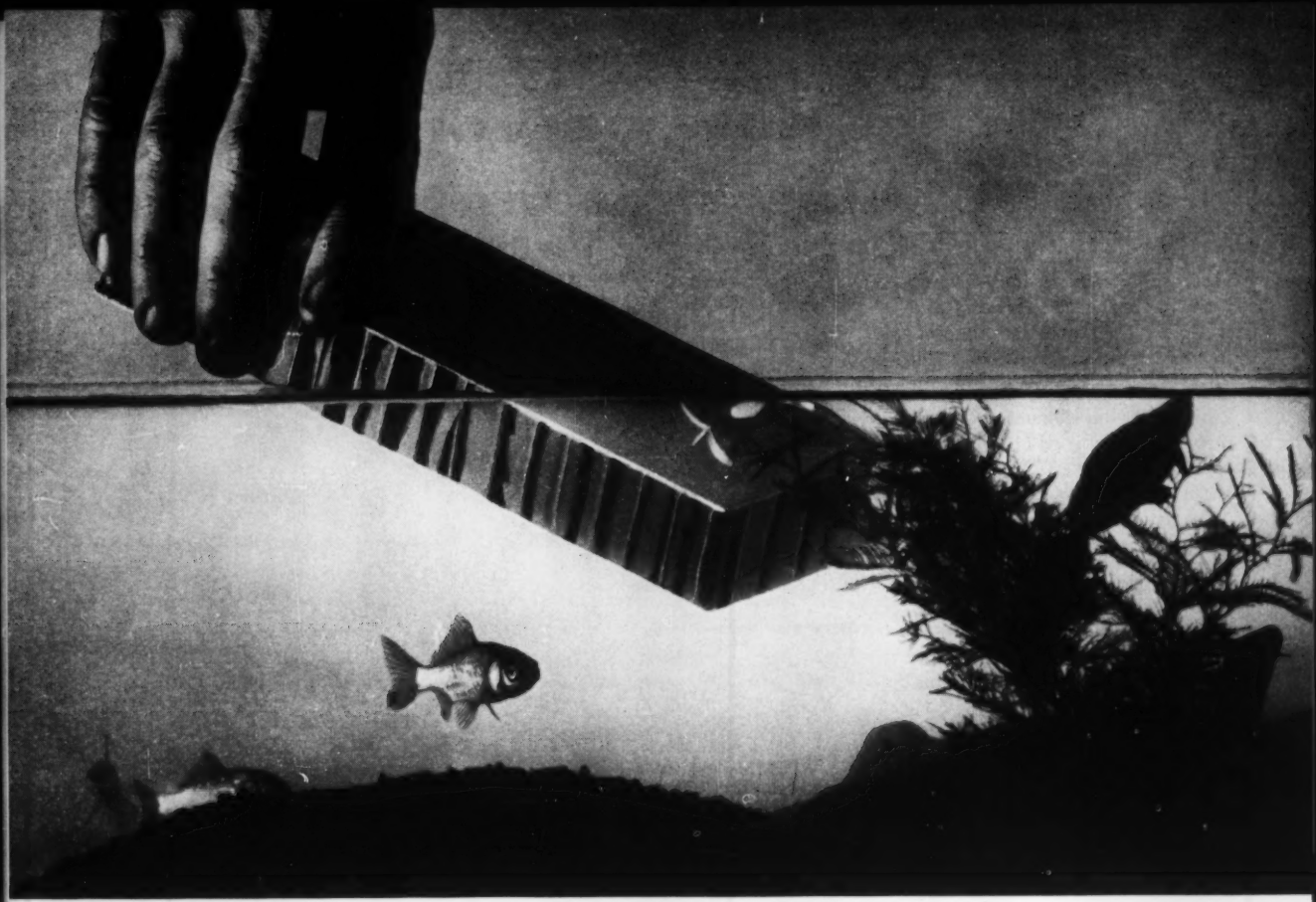
Company_____

Address_____

THE CHICAGO SCREW COMPANY

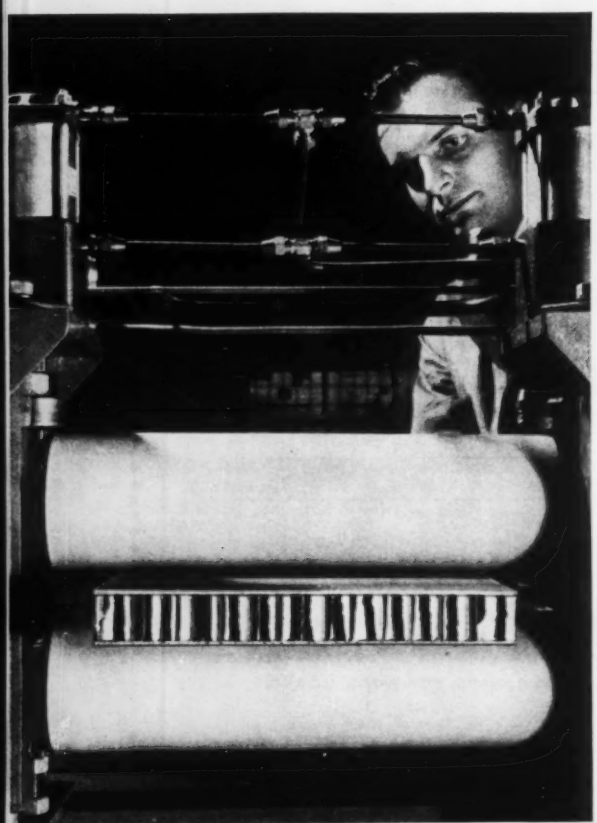
DIVISION OF STANDARD SCREW COMPANY • ESTABLISHED 1872

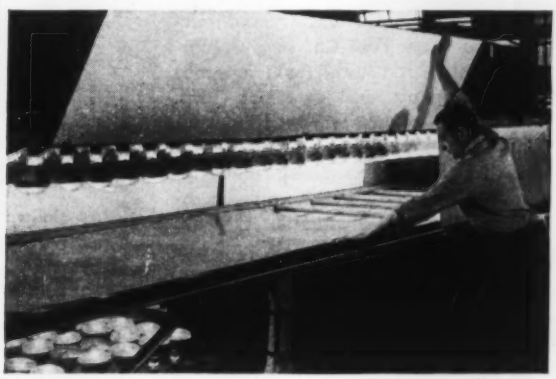
2500 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS



EC-1357 for non-load-bearing uses

Even under water EC-1357 continues fastening sandwich components securely. Moisture won't hurt this tough 3M adhesive bond. Neither will normal indoor and outdoor temperatures. The curtain wall panels and other exterior units you fabricate with EC-1357 ruggedly resist weather and exposure.



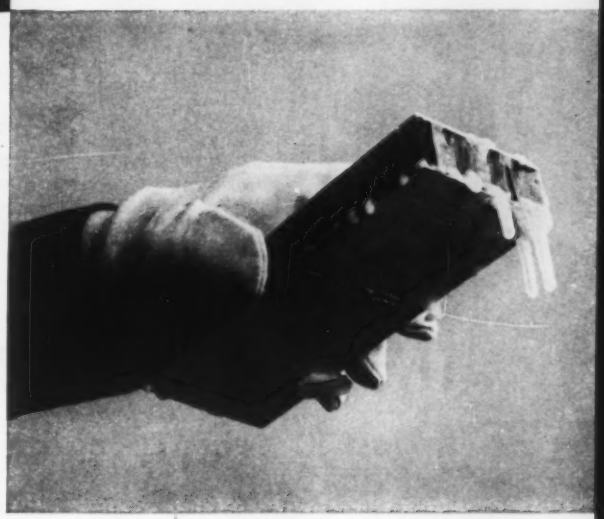


You can force-dry EC-1357 to get maximum immediate bonding strength fast. The adhesive grips skins and cores firmly together as production proceeds. You eliminate expensive drying and storage time. You gain continuous material movement from adhesive spraying to finished sandwiches. And EC-1357 builds up even more strength with age as it cures at room temperatures.

Nip roller or cold press is all you need to complete EC-1357 bonds. Whether you force-dry the adhesive or not, you can fabricate durable, high-strength sandwiches without clamps or heated presses.

EC-1177
for load-bearing uses

Rugged load-bearing ability of EC-1177 is proven by laboratory tests and experience both. In this adhesive, 3M research has combined high strength with rigidity under stress. You gain a heavy-duty bond that answers load-bearing sandwich demands.



Intense cold and heat don't faze EC-1177. It goes on bonding strongly despite severe temperatures. With EC-1177 you build high-temperature resistance right into load-bearing sandwich structures.

Beef up sandwich structures with these high-strength 3M adhesives

Put top strength into your sandwich structures right where it counts most . . . in the skin-to-core bonds.

You can with EC-1357 and EC-1177. These 3M adhesives are helping make sandwich construction the featherweight performance champ of a hundred industries.

- Flexible EC-1357 bonds lightweight skins and cores together into tough, resilient structures for non-load-bearing uses. And it goes on bonding securely despite moisture, heat, cold and exposure.

Here's durability that's vital in curtain wall panels, movable partitions and compartment separators.

What's more, EC-1357 speeds production. You can force-dry this 3M adhesive, get high bonding strength fast. Dark in color, it absorbs drying heat rapidly. With or without force-drying, you can bond sprayed surfaces cold, with just a nip roller or cold press.

- EC-1177 delivers the ruggedness your structures need to carry loads . . . high strength, rigidity under stress, great heat and cold resistance. Designers specify EC-1177 for aircraft walkways, trailer roofs and floors, platforms, shelves, tables and load-bearing partitions.

Compared to mechanical fastening, both EC-1357 and EC-1177 cut down heat transfer through panels. They reduce your risk of fracturing cores, too.

Whether you use steel, porcelainized steel, aluminum, anodized aluminum, bronze or hardboard skins . . . whether you use resin-impregnated paper, aluminum or stainless steel honeycomb cores, or cores of wood, fibrous glass or expanded cellular glass . . . investigate EC-1357 and EC-1177.

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Full facts on EC-1357 and EC-1177 are yours for the asking. Fill out and mail the handy coupon today. Or write on your business letterhead to the address at the right. 3M Research and 3M Field Engineers are ready to serve you.

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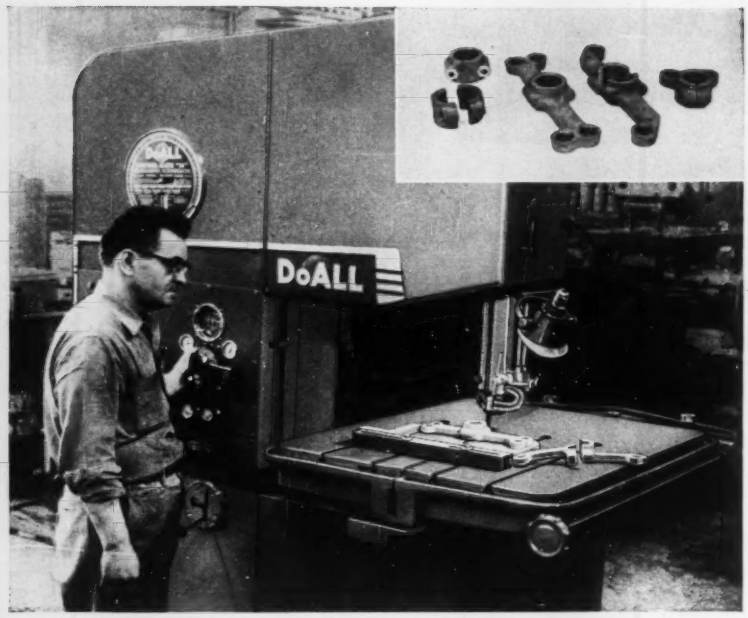
City_____ Zone_____ State_____



MACHINING PARTS for industrial lift trucks in ½ the time . . .

The Magic of "Tools"...

In Just 10 Years Living Improves 42%

During the past 10 years production of goods and services in the U.S. increased an astounding 42%. Nearly everybody today has more of everything . . . from homes to haircuts.

But there weren't 42% more people available to create this improvement. It was accomplished with only 18% increase in employment.

The magic: more and better "tools" that have increased individual productivity by 19% since 1946.

Look at the picture above. The machinist is using a new type of machine tool that has increased his output, not just 19%, but up to 50% or more. With it he slots, splits and shapes over 100 different parts for industrial lift trucks—in ⅓ to ½ the time formerly required with other types of machine tools.

More widespread use of newer, better tools like this new DoALL Contour-matic band machine is the only path to continuously greater human productivity . . . lower costs . . . and better living for everyone.

Industrial lift trucks help move torrential tonnages of consumer goods to market.

Manufacturers seeking greater production efficiency will find hundreds of machining operations that can be done better, faster and cheaper with DoALL machines. Literature available upon request.

Reprints of this series on economics available for your employees.

FREE DEMONSTRATIONS of DoALL band machines, surface grinders, lapping machines and gaging equipment available at your plant without obligation. Call DoALL locally or write.

The DoALL Company
Des Plaines, Illinois
38 Local Sales-Service Stores E-53

(*Concluded from page* 157)

Elliott Co., Jeannette, Pa., will be merged into **Carrier Corp.**, Syracuse, N. Y. Elliott makes steam turbines, electrical equipment, heat transfer apparatus, industrial process equipment (including power recovery gas turbines), centrifugal compressors and expanders and turbochargers. Carrier is a large manufacturer of air conditioning and industrial refrigeration equipment.

Ellicott Machine Corp., Baltimore, acquired a controlling interest in **McConway & Torley Corp.**, Pittsburgh, by stock purchase. The acquisition includes the McConway & Torley's subsidiary, Baltimore Foundry & Machine Corp., Baltimore. McConway & Torley will maintain its identity and will continue to produce a variety of steel castings. Principal officers of Ellicott Machine Corp. are: Chairman, C. E. Ellicott Jr.; president, Allan W. Mund; vice presidents, D. S. Sherwood, Robert S. Clas and C. P. Kaufmann; secretary and treasurer, Richard E. Bowe.

Consolidated Electrodynamics Corp. purchased the major assets of **William Miller Instruments Inc.**, Pasadena, Calif., manufacturer of dynamic recording and data-processing equipment. Subsidiaries of William Miller Instruments (Transformer Engineers and Pacific Transformer) were not included in the transaction.

ASSOCIATIONS

American Society for Abrasives, a national, nonprofit technical and study organization, has been formed. One long range objective is the establishment of uniform standards for abrasives and abrasive products. Jan L. Deelman, secretary, is in charge of the association's offices at 222 Berks County Trust Bldg., Reading, Pa. Other officers: National chairman, T. J. O'Connell, Macklin Co., Jackson, Mich.; president, J. Y. Arnold, Carpenter Steel Co., Reading; vice president, R. B. Rider, General Electric Co., Lynn, Mass.; treasurer, Willard Miller, Mt. Penn Trust Co., Reading.

Spring Steel

by SUPERIOR

for the

uniform behavior

you require

in fabrication!

in service!

Uniform, dependable response to your manufacturing processes and subsequent service requirements is outstanding in SUPERIOR Spring Steel. We build uniform behavior into every coil, from specified analysis of composition to final anneal before shipment. We're strip steel specialists: *you gain by it.* Specify SUPERIOR for your spring steel needs!

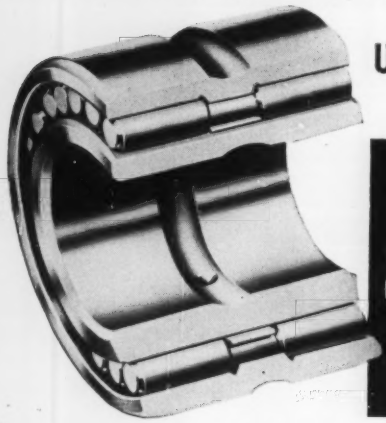
Superior Steel

CORPORATION

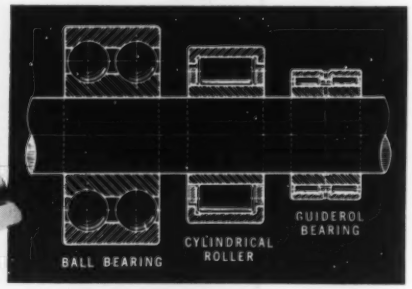
CARNEGIE, PENNSYLVANIA

BEARING TIPS by McGill

To pack more performance in smaller space



Use space-saving McGILL GUIDEROL® needle bearings

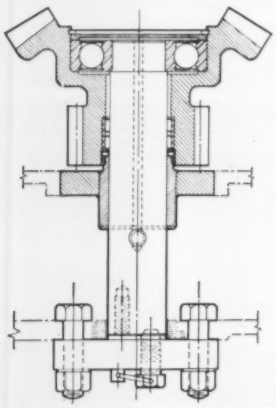


Showing graphically how a McGill GUIDEROL precision needle bearing permits more streamlined designing by supporting comparative loads in significantly smaller radial space than other types of bearings. Bulky and more costly housing space is easily avoided.

The McGill GUIDEROL Bearing combines the inherent high-load capacity of a full complement of full race width rollers with a center roller guiding principle that limits skewing and binding under misalignment. This qualifies the bearing for a whole range of applications that are too heavily loaded for a retainer-type bearing and are subject to the misalignment that precludes use of an ordinary needle bearing. For outstanding performance in small radial space, use GUIDEROL precision needle bearings. Specify the interchangeable sealed SGR series for added protection against contamination.

GUIDEROL® *bearing capacity, space economy proved in power shovel vertical reversing shaft assembly*

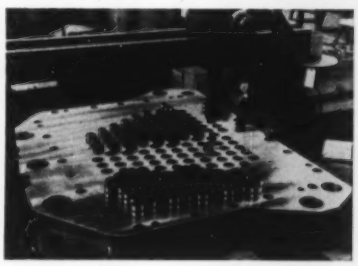
Baldwin - Lima - Hamilton Corp. uses a McGill GUIDEROL bearing, on ½ cubic yard power



shovels, to carry spur pinion loads in the vertical reversing shaft. The high capacity of the bearing in small radial space is an important factor in selection of this bearing. Only 3.75″ in diameter, it has a load capacity of 28,560 lbs. at 100 rpm. In the power shovel application, it supports 14,150 lbs. at 76.3 rpm, which gives a high margin of safety. The center guided rollers also are especially adaptable to a vertical application such as this.

Fact-packed Bearing Catalog

Write for your copy of Catalog #52-A, a 128 page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.



Multiple spindle drill heads require support of spindles on very close centers

Crowding a great number of drill spindles into a small area, Zagar, Inc., of Cleveland has found the McGill GUIDEROL bearing construction especially suited to the needs of multiple drill head units. The full bearing width rollers provide rigidity and more than adequate load capacity and in a bearing only 1.25″ in bore diameter.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

Technical Outlook

REACTOR JOINING— National Cylinder Gas Co., Chicago, says it is nearly ready to release details on a method of welding stainless steel in atomic reactor vessels. Weld deposits are expected to develop 80,000 to 90,000 psi tensile at 600°F. The method involves the new Dualshield semiautomatic welding equipment which uses CO_2 and a flux-filled, hollow wire.

SINTERING SWITCH— GM's Frigidaire Division has made some structural parts by hot pressing waste chips from machining operations. The parts have one drawback: They aren't gastight.

BUBBLETIGHT— A Teflon seat in a new stainless steel solenoid valve eliminates metal-to-metal contact and makes the valve bubbletight at 5000 psi. Made by Atkomatic Valve Co. Inc., Indianapolis, the valve is a small, direct lift, angle type and can be used for fluids or elusive gases such as helium, nitrogen and carbon dioxide.

COMPUTER SERVICE— Blaw Knox Co., Pittsburgh, held a seminar in Cleveland to explain how its new high speed computer method can be used to figure stress in piping systems. Problems that took a month can be worked out in one day. The company will make computations for outside firms on a contract basis.

ELECTRONS TELL ANSWERS— Bouncing a stream of electrons off the surface of a material produces a pattern that can be used to guide the development of better manufacturing processes and materials, says General Electric Co. It believes its new electron diffraction instrument will help scientists analyze the chemical changes that take place in corrosion before they are detectable by a microscope; detect the changes that occur in lubricant films used in machinery; and study the interaction of thin films of metal and the nature of surface deposits, such as boiler scale and other chemical residue.

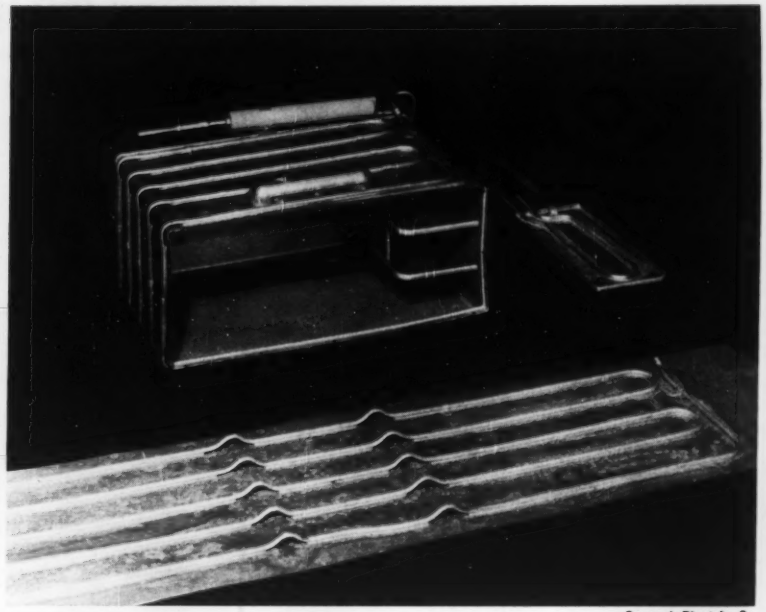
MORE PAYLOAD— Truck dump boxes made of welded 5086 aluminum sheets and plates weigh up to 1500 lb less than those made from conventional material, claims General Machinery Co., Spokane. The firm uses the consumable electrode method with a 75 per cent helium, 25 per cent argon mixture for shielding. The alloy is supplied by Kaiser Aluminum & Chemical Corp., Oakland, Calif.

17-7 PH DESCALER— Turco Products Inc., Los Angeles, has developed a process to remove heat treat oxides of 17-7 PH stainless. Metal loss (0.0002 in. per side) is lower than it is with conventional acid descaling methods. A pretreatment coating is used to prevent excessive hydrogen contamination, intergranular attack and badly roughened or overetched surfaces.

SATELLITE METALS— Glenn L. Martin Co., Baltimore, builder of the 72-ft, 11-ton launching vehicle for Vanguard, the earth satellite, reveals that first-stage propellant tanks are welded aluminum; those in the second stage are stainless steel; the rest of the second stage skin is a magnesium-thorium alloy. The nose cone is a molded asbestos phenolic material with a titanium tip.

Metalworking Outlook—p. 115 Market Outlook—p. 231

Most aluminum alloys can be brazed into strong, corrosion-resistant assemblies. A number of methods are described to help you choose the best for your need



General Electric Co.

Aluminum tubing is furnace brazed to flat aluminum sheets to make refrigerator parts

How To Braze Aluminum

BRAZING enhances the versatility of aluminum. It offers unique design and fabricating freedoms that can lead to important savings.

Typical aluminum brazed assemblies include refrigerator evaporators, heat exchangers, fuel tanks, aircraft parts and similar products.

Advantages—Strong, heat-treatable aluminum alloys can be brazed in many cases. Many joints can be made simultaneously. Complicated assemblies with inaccessible joints, made from thick and thin material, can be joined in one operation by furnace or dip brazing.

An all-aluminum structure is produced by brazing. The as-brazed shape gives good stress distribution and fatigue resistance. Finishing costs are low; thin sections are readily brazed without distortion; and production costs are lowered.

Alloys — The nonheat-treatable aluminum alloys brazed most successfully are 1100 and 3003. Wrought alloys of greater purity than 1100 (99 per cent Al) also are brazable.

If strength is important, before brazing any alloy investigate: 1. The heat treatment or work hardening to which the metal has been subjected. 2. The manner in which brazing heat will affect the properties imparted by prior treatment.

Brazing temperatures vary between 1030 and 1190°F; the annealing temperature for aluminum alloys ranges from 650 to 800°F. Brazing will return at least part of the finished assembly to the annealed state.

Brazable Alloys—Heat-treatable alloys are brazable, if their melting points are above the melting range of the filler metals used. The heat-treatable alloys most commonly brazed are 6053, 6061, 6062, 6063 and 6951.

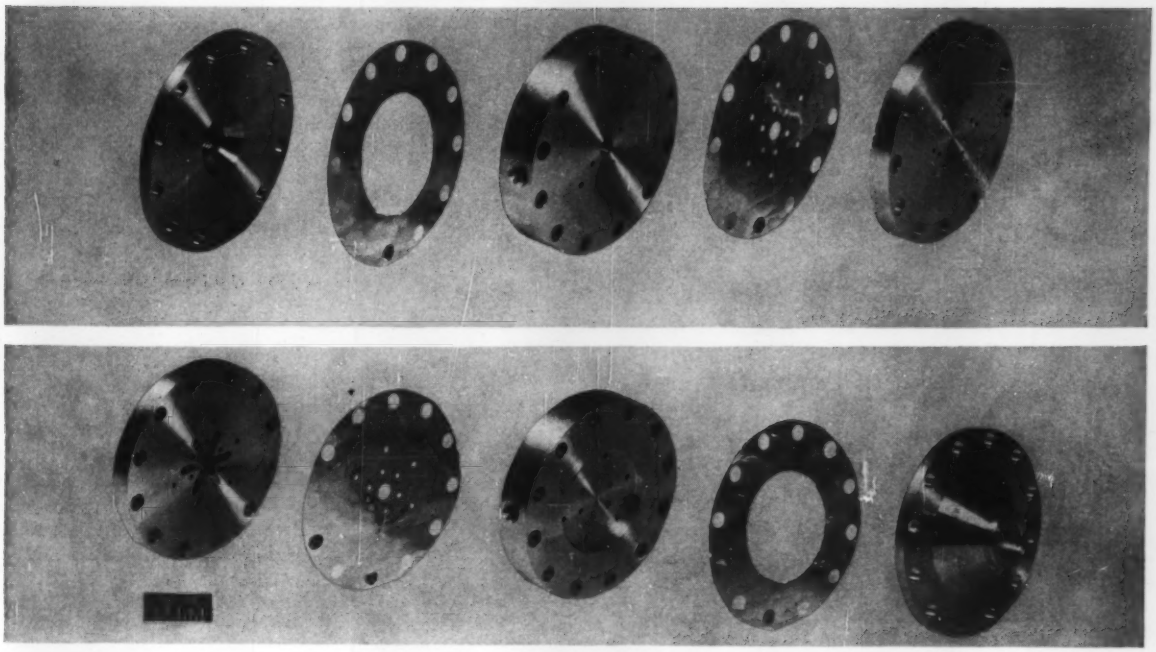
Although the brazing temperature used for heat-treatable alloys is somewhat higher than that generally used for heat treating, the brazing cycle, followed by quenching and aging, will nearly duplicate properties obtained by regular heat treatment.

Be careful that the rapid cooling does not distort the finished assemblies. Brazed assemblies of heat-treatable alloys also can be slowly cooled, followed by normal heat treating, quenching and aging procedures.

Castings—Sand castings of A612 alloy, permanent mold castings of C612 and sand or permanent-mold castings of alloy 4043 have been brazed. Special techniques have been developed to braze alloy 356. Brazing often simplifies foundry work enough to result in an overall saving in the production of elaborate pieces.

Some aluminum alloys cannot be brazed—alloys with melting points below those of the available filler metals.

Alloys 2011, 2014, 2017, 2024 and 7075 are not ordinarily brazable with commercially available filler alloys.



National Advisory Committee for Aeronautics.

Exploded views of aluminum rocket injector. Shims of aluminum-silicon alloy are used to braze the intricate three-part assembly

In addition to the zinc-bearing and copper-bearing alloys, aluminum alloys with a high magnesium content are difficult to braze. Diecasting alloys are impractical to braze because they blister under brazing heat.

Filler Metals—Alloys for brazing aluminum come in the form of wire or shims or in special sheets on which a uniform coating of filler metal is integrally bonded to the base metal.

Round wire of various sizes is used in rings or in straight sections, as required for preplacement. Shims are made from flattened wire or sheets. When the filler metal is applied as an integral coating to the sheet, the product is called "brazing sheet."

The coatings are aluminum-silicon alloys and may be applied to one or both sides of the sheet. The bonding is done in rolling the sheet, and the result is a product that can be formed by drawing, bending or other processes that do not remove the coating. The formed parts can be assembled, fluxed and brazed without placing additional filler metal in the joint.

Flux—A flux is essential. All

Table I—Aluminum Alloys That Can Be Brazed

Alloy	Brazability	Nominal Composition* Cu	Si	Mn	Mg	Zn	Cr	Melting Range °F
EC	A	(99.45% min Al)						1195-1215
1100	A	(99% min Al)						1190-1215
3003	A	..	..	1.2	..	..	..	1190-1210
3004	B	..	..	1.2	1.0	..	..	1165-1205
5050	B	..	..	..	1.2	..	..	1160-1205
6151	B	..	1.0	..	0.6	..	0.25	1025-1200
6951	A	0.25	0.35	..	0.65	..	..	1140-1210
5052	C	..	..	..	2.5	..	0.25	1100-1200
6053	A	..	0.7	..	1.3	..	..	1105-1205
6061	A	0.25	0.6	..	1.0	..	0.25	1115-1205
6062	A	0.25	0.6	..	1.0	..	..	1115-1205
6063	A	..	0.4	..	0.7	..	..	1140-1205
Cast 43	A	..	5.0	..	..	..	..	1065-1170
Cast 356	C	..	7.0	..	0.3	..	..	1035-1135
Cast 406	A	..	(99% min Al)			..	..	1190-1215
Cast A612	B	0.5	..	..	0.7	6.5	..	1105-1195
Cast C612	A	0.5	..	..	0.35	6.5	..	1120-1190

* Per cent of alloying elements. Remainder: Aluminum and normal impurities.

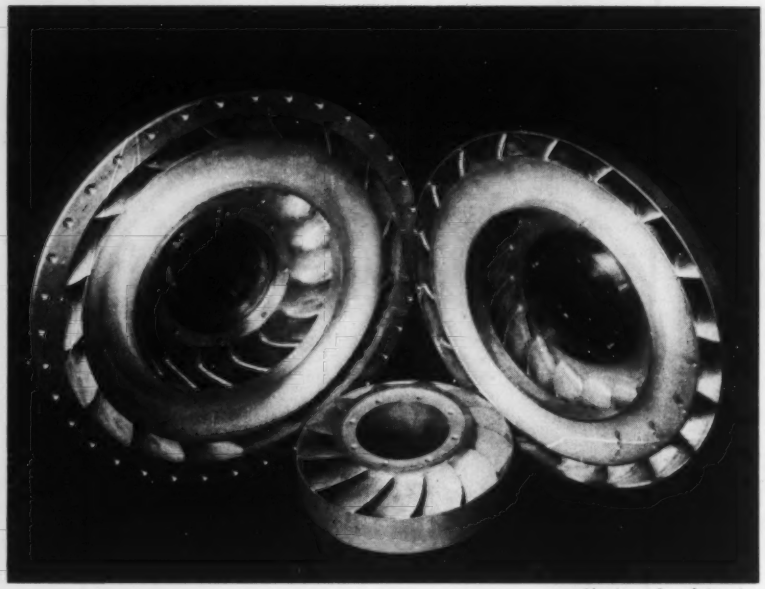
Brazability Ratings:

A—generally brazable by all commercial procedures and methods.

B—brazable with special techniques on applications which justify preliminary trials or testing to develop procedure and performance of brazed joints.

C—limited brazability.

Source: Brazing Alcoa Aluminum.



Aluminum Co. of America.

Three elements of a bus transmission were assembled by brazing forgings, permanent-mold castings, sand castings and formed brazing sheet

aluminum brazing fluxes are powders. They can be applied dry or mixed with tap water or alcohol and applied by painting, spraying or dipping. Dry flux can be sprinkled on the work or a heated rod of filler metal can be dipped into the dry flux.

A mixture of two-thirds flux and one-third water by weight usually is satisfactory for painting. A thinner mixture is used for spraying or dipping; the amount of water needed to suit the parts or the spray gun used is determined by trial.

Furnace Brazing—This equipment is a lot like that used for heat treating these materials. It is designed to operate at temperatures up to 1200°F and may be heated electrically, with oil or gas.

Fast heating is necessary. Otherwise, the center of a part such as a radiator does not heat as fast as the outside. An incomplete braze may result.

Time—The usual procedure is to adjust the furnace time from 30 seconds to 2 minutes longer than is required to bring the joint to brazing temperature. Too long a time at temperature may result in excessive diffusion, loss of control of filler metal flow and attack from flux.

It is best to prevent contact of the molten brazing flux with metallic furnace parts because the flux will corrode any of the ordinary furnace materials. This usually is done by using shallow pans of ordinary steel to catch any flux that may drop. The pans can be replaced at a much lower cost than the furnace lining or hearth parts.

Both continuous and batch furnaces have been used successfully. In some furnace designs, fast heating of the work is obtained by providing a high temperature zone at the entrance of the furnace. In it, the part is brought to within 50 to 100°F of the brazing temperature, then moved to the brazing zone which is controlled to ±10°F.

Dip Brazing—This method is widely used for making heat exchanger assemblies. A part with preplaced brazing filler metal is dipped into molten brazing flux. Fluxing and raising the part to brazing temperature are done simultaneously. There are several pot designs and methods of heating the flux containers.

Resistance heating of the bath is used almost entirely for production applications although externally fired, gas-heated pots are adaptable to experimental and development work. Ceramic linings have been the only materials with sufficient resistance to provide a long life.

Procedure — Parts to be dip brazed are preheated before immersing in the molten flux. Preheating temperatures range from

Table II—Aluminum Brazing Filler Metals

AWS Classification	Nominal Composition Si	Cu	Al	Brazing Temperature Range	Application
BAlSi-1	5	—	95	1150-1185	General purpose alloy for torch, dip and furnace brazing.
BAlSi-2	7.5	—	92.5	1120-1140	Cladding on aluminum alloy core sheet; dip and furnace brazing.
BAlSi-3	10	4	86	1060-1185	General purpose alloy for dip and furnace brazing.
BAlSi-4	12	—	88	1090-1185	General purpose alloy used in some cases for its relatively high corrosion resistant properties. For torch brazing; may also be used for furnace and dip brazing.

Source: American Welding Society's Brazing Manual.

900 to 1050°F, depending on the size and contour of the work.

Preheating is necessary to prevent solidification of the flux bath which occurs when a cold part is immersed, and to dry the part to eliminate possible rapid steam generation. Solidification of the flux insulates the part and closes small openings so the molten flux cannot reach the inside.

Hand Method—Torch brazing is done manually, similar to gas welding. Flux is mixed with water or used dry and applied to both the work and the filler metal by brushing, dipping or sprinkling. Oxyacetylene, oxyhydrogen and oxy-natural gas flames are used. The torch is adjusted so the flame is on the reducing side.

Aluminum assemblies are brazed most frequently by the furnace, dip or torch methods. But gas-fired machine brazing, induction brazing, block brazing or metal dip brazing often may solve a specific problem better than the more common processes.

Mechanized Flame — Gas-fired machines are good for brazing large quantities of small parts, such as assembling fans and attaching small handles. No single description can suffice for gas-fired brazing machines; the number of tooling systems is almost equal to the number of kinds of parts brazed this way.

Generally, the process involves moving the workpieces past a flame or a series of flames on a rotating platform, a mechanized belt or some other type conveyor. The flame may be any of the types used in ordinary torch brazing.

Flame — As far as the parts themselves are concerned, gas-fired machine brazing differs little from hand torch brazing. The torch is adjusted to give a slightly reducing flame. It must be hot enough to melt the filler metal without being so hot that it melts the parent metal during the time the flame plays over the assembly.

As in other kinds of brazing operations, timing must be carefully worked out, with this extra precaution: The assembly must not be exposed long enough to be harmed by combustion gases.

Multiple flames in various combinations can be adapted to braze assemblies of different shapes and thicknesses. Flames may surround the part. Successive flames may be used to bring thick assemblies up to brazing temperature, or they may be used to make several joints in different positions on the same piece.

Table III—Brazing Aluminum to Other Metals

Metal or Alloy Joined to Aluminum	Brazability	Pretreatment
Ferrous alloys	A	Best results obtained by electroplating or aluminum-coating the ferrous parts.
Nickel, Inconel	A	Can be brazed directly or precoated with aluminum.
Titanium, Kovar	A	Aluminum-coat parts before brazing.
Beryllium	B	Can be wetted directly by aluminum brazing alloys.
Monel	B	Can be wetted directly but may tend to be brittle.
Copper, Brass	C	Difficult, requires special techniques to avoid brittleness; can use a steel transition section.
Magnesium	D	Too brittle to be of use.

Brazability Ratings: See Table I. Source: Brazing Alcoa Aluminum.

Induction Brazing—The advantage of induction brazing is that heat can be localized without use of flame. High-production runs easily repay the higher cost of designing and making the necessary equipment.

Heat is provided by the resistance losses of eddy currents set up by the field of a high-frequency induction coil surrounding all or part of the assembly.

Block Brazing—This method is the modern counterpart of a blacksmith's brazing with heavy heated tongs. It is used in brazing plate-type heat exchangers and refrigeration evaporators that are designed for narrow line contacts.

Flux and filler metal are placed between the workpieces at the joints. Heated dies that conform to the general outline of the part being brazed are clamped over the assembly with sufficient pressure to squeeze the flux out from the edges of the joint as the filler metal is melted.

The blocks may be heated by gas or electricity. The need for close temperature control swings the balance in favor of electric heating in the opinion of most welding engineers.

Metal Dip Brazing—This process consists of dipping assembled and fluxed parts into a bath of molten brazing alloy. It has been used to braze bundles of hex-end tubes for oil cooler cores.

After preheated assemblies are dipped in molten flux, they are dipped into molten aluminum-silicon alloy for a few seconds. The temperature of the molten alloy and the time of dipping are critical because of the solvent action of the brazing alloy on the parts.

With proper mechanization, the method is useful for certain parts. The same procedure can also be used for coating parts with brazing alloy.

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In Perspective

HOW IMPORTANT is the designer in the drive for economical production?

"Production cost levels are set in the engineering phase, and design can do more to influence profit and loss than any other single link in the product chain," says GE's Halverstadt. His ideas are the basis of this article.

The problem of producible design, always important, becomes critical when tough, high temperature metals and alloys must be machined. Recent statements indicate that speeds for machining the high temperature aircraft alloys are about the same as those used for other metals 25 years ago. At such speeds, production costs can be prohibitive.

Design can make or break a job. In closing a talk at the recent American Society of Tool Engineers' meeting in Houston, Mr. Halverstadt gave this advice to design engineers: "The over-all rule which will produce the best results is to . . . put yourself into the processing engineer's place . . . try to design for machining."

Design for Machining High

A large part of the production cost is set at the designer's drawing board. Here are some tips on how to hold down costs on the critical, tough-to-cut metals

REQUIREMENTS of high temperature materials dictate close co-operation between design and manufacturing. The materials are almost always difficult to machine. In fact, some operations are nearly impossible.

Outlining what the design engineer should know, R. D. Halverstadt, supervisor of the metalworking laboratory at General Electric's jet engine and aircraft gas turbine departments, Cincinnati, says it is important to know and understand the problems of the processing engineer.

The designer should have an understanding of the machining fundamentals, should consider machinability when he selects materials and should know guideposts to all machining operations to be done.

MATERIAL SELECTION

Mr. Halverstadt says machining is a shearing process. "In general, it is safe to say that the higher the high temperature shear strength of a material, the more difficult it is to machine."

Machinability is defined in terms of a curve which plots cutting speed against tool life. This curve can be used by the designer as an aid in selecting material for a design.

Similar steels and irons can give widely different results (as much as 50 to 1) on machinability because of different metallurgical structure and annealing.

Mr. Halverstadt advises: "Study the machinability of the material before final selection. Make sure that it is heat treated properly for best machining conditions.

"Each material and operation are individual problems with separate solutions. The important thing to remember is that proper material selection with the proper heat treatment is the first and one of the cardinal steps in designing for practical production."

DRILLING

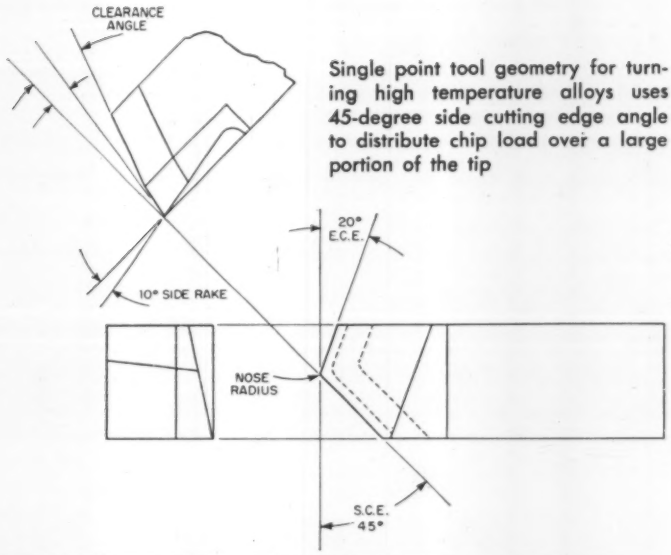
This is one of the toughest of all jobs with high temperature alloys. Some answers must come from the machine shop, but others can be solved best on the drafting board.

Here are some rules:

Don't design for drilling into or through an angular surface. Side thrust will deflect the drill and cause inaccurate hole location. If a jig is used, the side thrust will cause rapid jig bushing and drill wear.

Drilling through an angular surface presents the same problem. As the drill goes through and cuts only on one side, a high strain is thrown on the drill. It can spell excessive drill wear and an elongated hole as a result of the thrust. It also may cause drill breakage.

Don't design a hole to be drilled with less than about 200 degrees of arc. If less than a ½-in. drill is used, it will tend to lead off.



Single point tool geometry for turning high temperature alloys uses 45-degree side cutting edge angle to distribute chip load over a large portion of the tip

Temperature Alloys

Try to design for one operation. This is particularly true for austenitic alloys that are subject to work hardening where it may be difficult to start a second operation through work hardened surfaces.

Make small holes as large and as shallow as possible. The ability of a drill to cut is, for one thing, a function of torsional rigidity—partly an inverse function of length divided by area. Use larger diameters and/or shorter drills to make length/area as small as possible.

Make hole locations as liberal as possible. Extremely accurate location requires long drill bushings, and they preclude the use of short drills, boosting the length/area rigidity function.

Eliminate drilling on nonrigid parts. If a part is not rigid, it will deflect while the feed of the drill is building up enough force to penetrate. During deflection, the drill point rubs on the surface, causing work hardening.

TAPPING

Here are Mr. Halverstadt's guideposts to tapping high temperature alloys.

Tap through whenever possible. It will permit the use of spiral-point taps which have proved superiority for these alloys.

Reduce the percentage of full thread. Threads can be just as strong and much easier to cut if torque requirements on the tool are reduced.

Use as large a tap as possible that will satisfy design requirements. Use as short a length of thread as possible. Avoid extremely coarse pitch threads. Leave plenty of space at the bottom of the tapped hole.

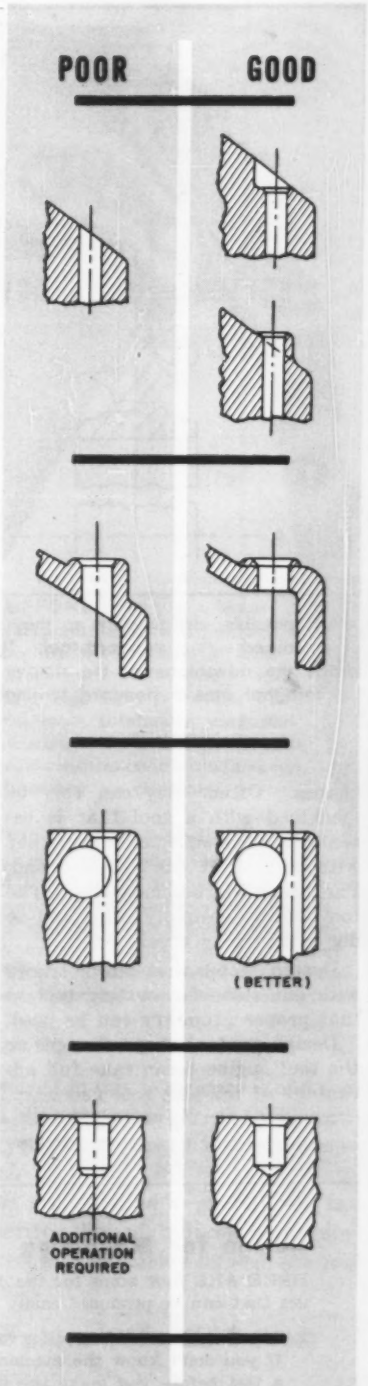
TURNING

The ability to turn hinges on tool geometry. It sometimes is set by the designer and cannot be changed at will by the process engineer. The first thing to do, according to Mr. Halverstadt, is to look at the most desirable geometry for cutting the high temperature alloys.

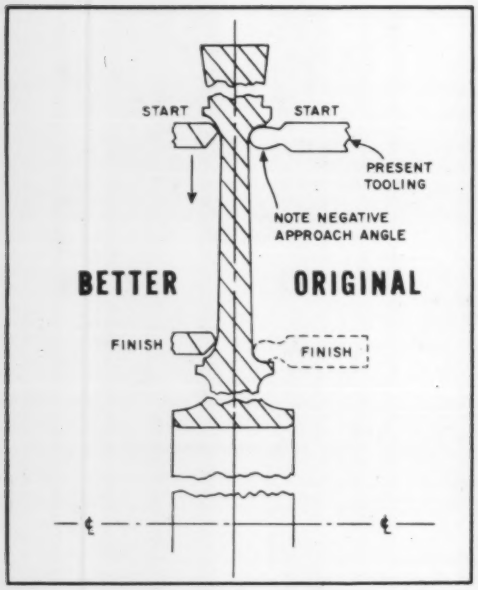
Chiefly it consists of: Positive rake angles, small nose radiuses blended into a high lead angle and low end cutting edge angle.

That means it's necessary to specify chamfers instead of radiuses when possible, and to design shoulders and other shapes so this geometry can be utilized.

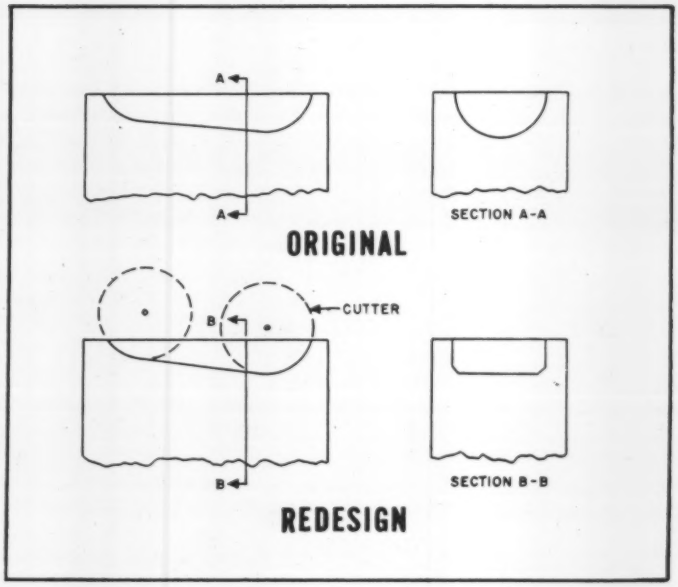
Slots — In turning and boring, avoid deep slots of complicated



Drawings show how parts can be designed for easier drilling. The two panels above show how to avoid drilling angular surfaces



When possible, design parts so they can be cut or contoured with a standard tool. This drawing shows the advantage of the simpler design at the left that uses a standard turning tool



Milled slot at the top was almost impossible to end mill in high temperature alloys. The redesign is much simpler to make since a standard side mill can be plunged in, then traversed

shapes. Often, they can only be machined with a tool that is essentially a simple cantiliver bar with a load at the extreme end. The result will be chattering. The tool will dull rapidly, will tend to dig in and may break.

Design shapes that can be traced with one side of a cutting tool so that proper geometry can be used.

Design gradual shape changes so the tool engineer can take full advantage of the best tool geometry.

Avoid undercuts or other difficult shapes where nonrigid tools must be used.

Design simple shapes that can be made with single point tools insteady of form tools.

MILLING

Principles that apply to other operations also apply to milling. The turning tool shape also would be good for milling.

Chamfer into or out of a milled step instead of designing for a 90-degree step. Use a chamfer instead of a radius on any designs that must be milled.

End milling on some alloys is almost impossible. If the end mill must be entered into the cut axially, the center portion tends to cause work hardening and ultimate failure. Design slots or keyways so they can be cut with a side mill, or (at least) so the end mill can enter from the end of the piece.

GRINDING

Grinding can severely damage the surface. Mr. Halverstadt has measured damage from residual stresses up to 0.025 in. deep, even though the measured surface finish was excellent.

Make tolerances and finish requirements as liberal as possible. This will permit free-cutting grinding instead of burnishing that might cause surface damage.

Thread grinding and other types of form grinding are extremely difficult with some of these alloys. Make any form change as gradual as possible so no sharp corners must be ground.

Design for Machining

HERE ARE four steps for the designer to take in aiming at a product that can be produced easily at minimum cost:

1. Select materials that will give best results in the production plant. If you don't know the machinability of an alternate material, run a test before you make the final selection.
2. Design for your production methods and make sure they're the most economical methods you could choose.
3. Investigate the true surface characteristics of your processing method. Don't set your standard on surface finish alone.
4. Know the effects and requirements of each machining operation. Don't assume that because one is feasible others will be satisfactory.

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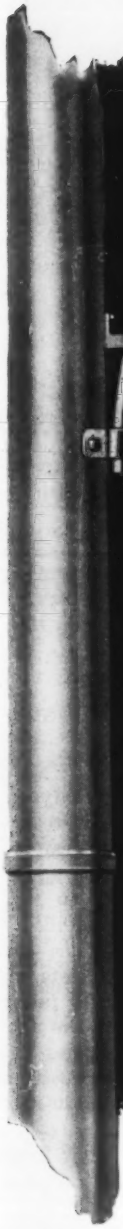
PERFORMANCE *Shines!*



How Stainless Steel from the HOUSE OF STAINLESS Helps Manufacturer Build Extra Years of Service Into Street Light Reflectors

BEFORE—For years, manufacturers of street lighting reflectors were limited in their choice of material because of the need for high light reflection. The material most commonly used met this requirement, but lacked the strength and corrosion resistance to withstand continuous abuse from the elements.

AFTER—Not satisfied with this performance, Line Material engineers consulted The House of Stainless to explore the possibilities of stainless steel for this product. Obviously, stainless offered the strength, rigidity and corrosion resistance needed. But what about reflecting qualities? CSS metallurgists came up with the answer—electro-polishing the stainless steel reflector surface.

While the application involved in this experience is of a special nature, it illustrates the lengths to which CSS metallurgists go in helping you utilize the many advantages inherent in stainless steel.

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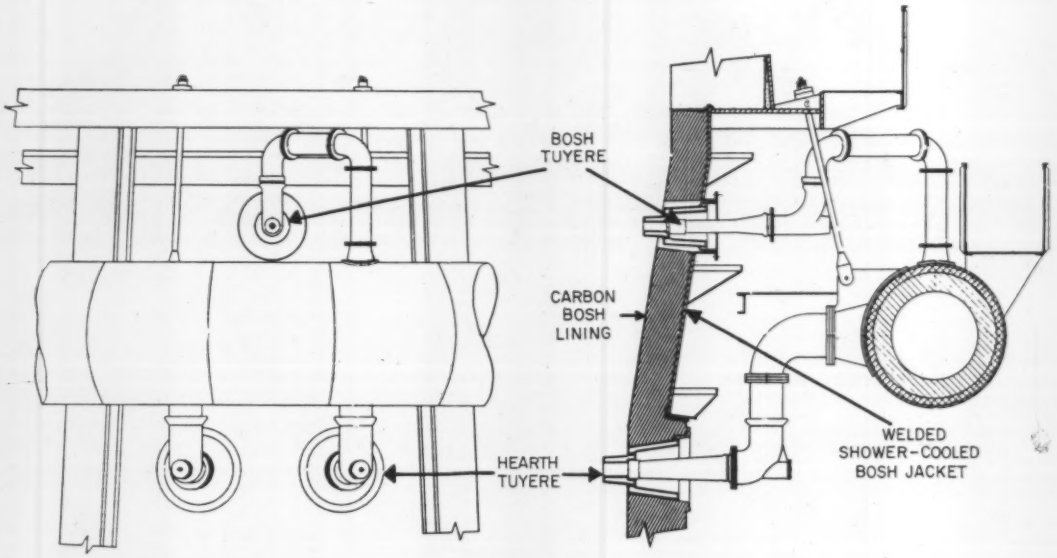

Bosh tuyere design as used on blast furnaces at Appleby-Frodingham Steel Co., Scunthorpe, Lincolnshire, England

Superrefractory for Open Hearth Roof

Highlights of the Pittsburgh AIME sessions . . . the all-basic open hearth roof . . . bosh tuyeres . . . stack cooling in the blast furnace . . .

"CHEMICALLY bonded and burned natural materials have done about all they can to extend the life of the open hearth furnace. The next step will be synthesis of refractories to get the chemical composition and physical properties we need."

The observation was made by a refractory engineer for a large steel company at the AIME meeting in Pittsburgh.

A "next step" refractory is being tried in an open hearth roof at Republic Steel Corp., Cleveland. C. W. Cravens, assistant Cleveland district manager, described some of the results with it.

The refractory is Electrocast 104, made by Corhart Refractories Co. Inc., Louisville. As the name implies, it is melted in an electric furnace and cast into billets. They are diamond sawed into furnace shapes.

Glass Tanks — Essentially a chrome-magnesite basic material, it has had a long history of success in the glass industry, where it is used to line melting tanks. High cost (as much as ten times that of conventional basic brick) has kept it out of the open hearth roof. Previous steelmaking trials with it have been confined to electric furnace hearths and the open hearth slag line.

Despite cost, Republic felt that the exceptionally high density and compressive strength achieved by this type material at high temperatures were good reasons for a trial. The first test was made in 1955, when seven rings were installed in the center section of a silica open hearth roof. After 200 heats, the furnace went down due to failure of the silica portion of the roof. During the campaign, it was necessary to repair the silica sections three times, the Electrocast rings not at all.

Durable — Several more trials with zebra, checkerboard and panel roof patterns showed roof life to be much limited by the silica portions. Combinations of Electrocast and metal-encased basic brick, in which the Electrocast section reached 299 heats before rebuild, pointed the way to a roof constructed entirely of the cast material.

Such a roof, installed at a cost $3000 higher than the previous rebuild, will need to last 388 heats

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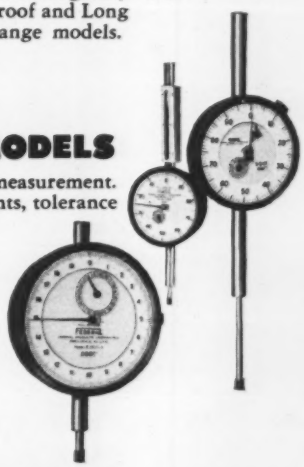

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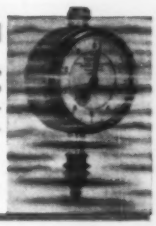

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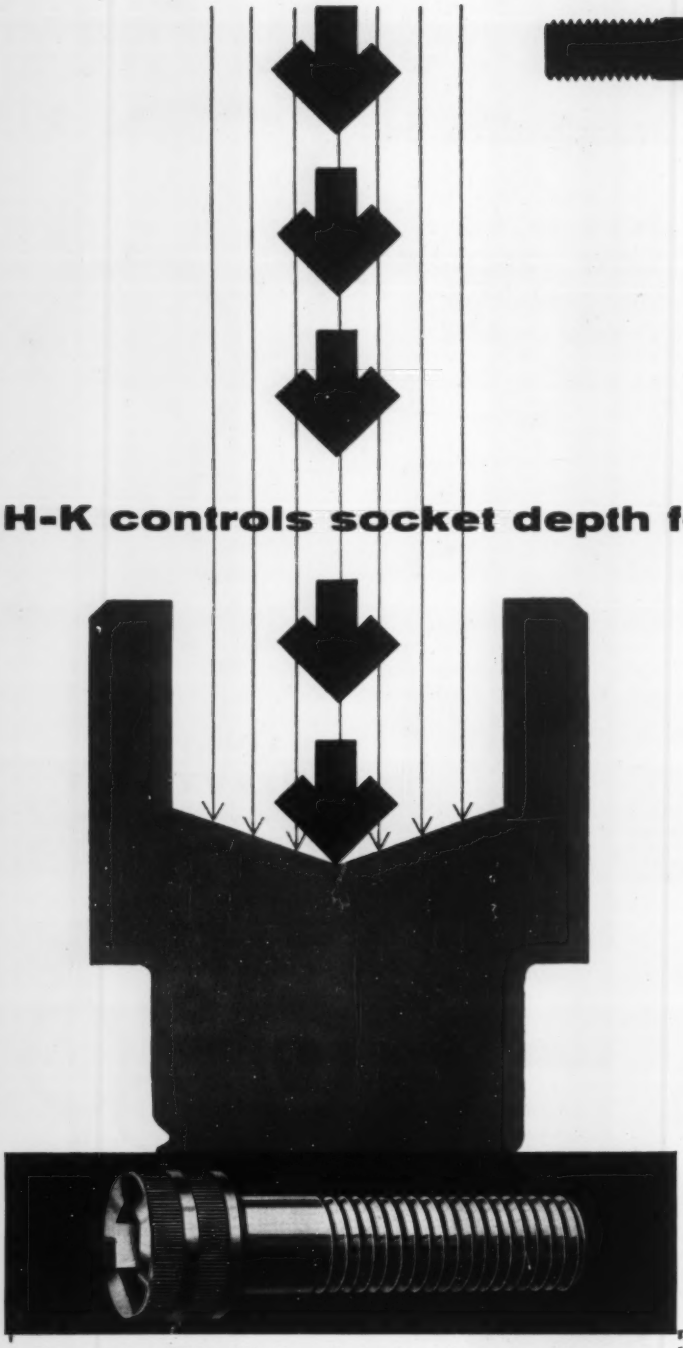

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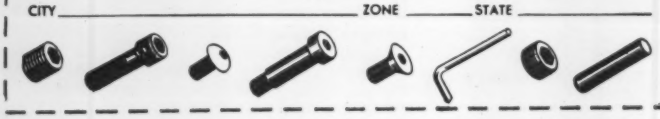

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to prove economical through decreased delays and increased tonnage. At 75 heats, it showed some roughness but no need for patching. It has permitted faster light-up and a higher firing rate, but peak temperature is limited by what the checkers will take.

How High?—Speakers describing basic roof progress at half-a-dozen shops seemed to agree that the full potential of the roofs has not been realized. Keystone Steel & Wire Co., Peoria, Ill., in particular is satisfied that basic roofs mean longer furnace life and increased production, A. H. Sommer, vice president and general superintendent of Keystone, reported. Keystone will soon light its fourth all-basic furnace.

Several panelists felt that improved furnace design has as much to contribute as type of brick. There's a lot of interest in the flat basic roof but no agreement on how high it belongs above the bath or floor. Heights from floor plate to roof range from 7 ft at Inland Steel Co., East Chicago, Ind., to 8 ft 6 in. at Armco Steel Corp., Middletown, O. One speaker commented that with the higher firing rates associated with basic construction, a roof on the high side would increase roof life.

A carbon subhearth in the No. 1 furnace at the Warren, O., shop of Republic Steel Corp. has reduced bottom delays. It has resulted in less fettling time and a hotter working hearth. The furnace is nearing a 400-heat campaign and is expected to produce 100,000 tons.

Blast Furnace—Orthodox ideas in blast furnace design came in for questioning from G. D. Elliot, works manager, iron, Appleby-Frodingham Works, United Steel Companies Ltd., Scunthorpe, England. "Why," he asked, "do most operators still consider a bosh to be necessary?"

He did not suggest that iron smelting can be carried out successfully in a parallel-sided shaft furnace. (He acknowledged the effects of wall friction, carbon deposition and changes in volume from liquefaction.) Still, he argued: "In the past, far too much importance has been attached to the influence of the odd foot or so

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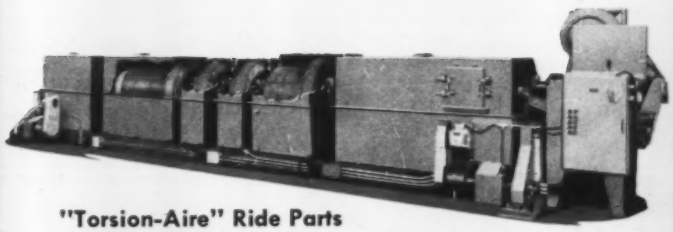
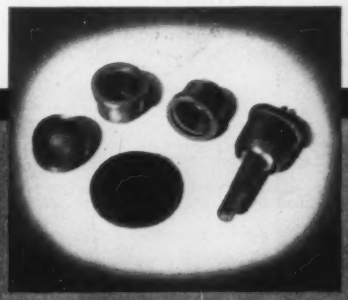


"Torsion-Aire" Ride Parts Prepared for Cold Extrusion with DETREX Processing Unit



Automatic Rotary Transfer Continuous Multi-Stage Processing Unit installed at Chrysler Corporation, New Castle, plant.

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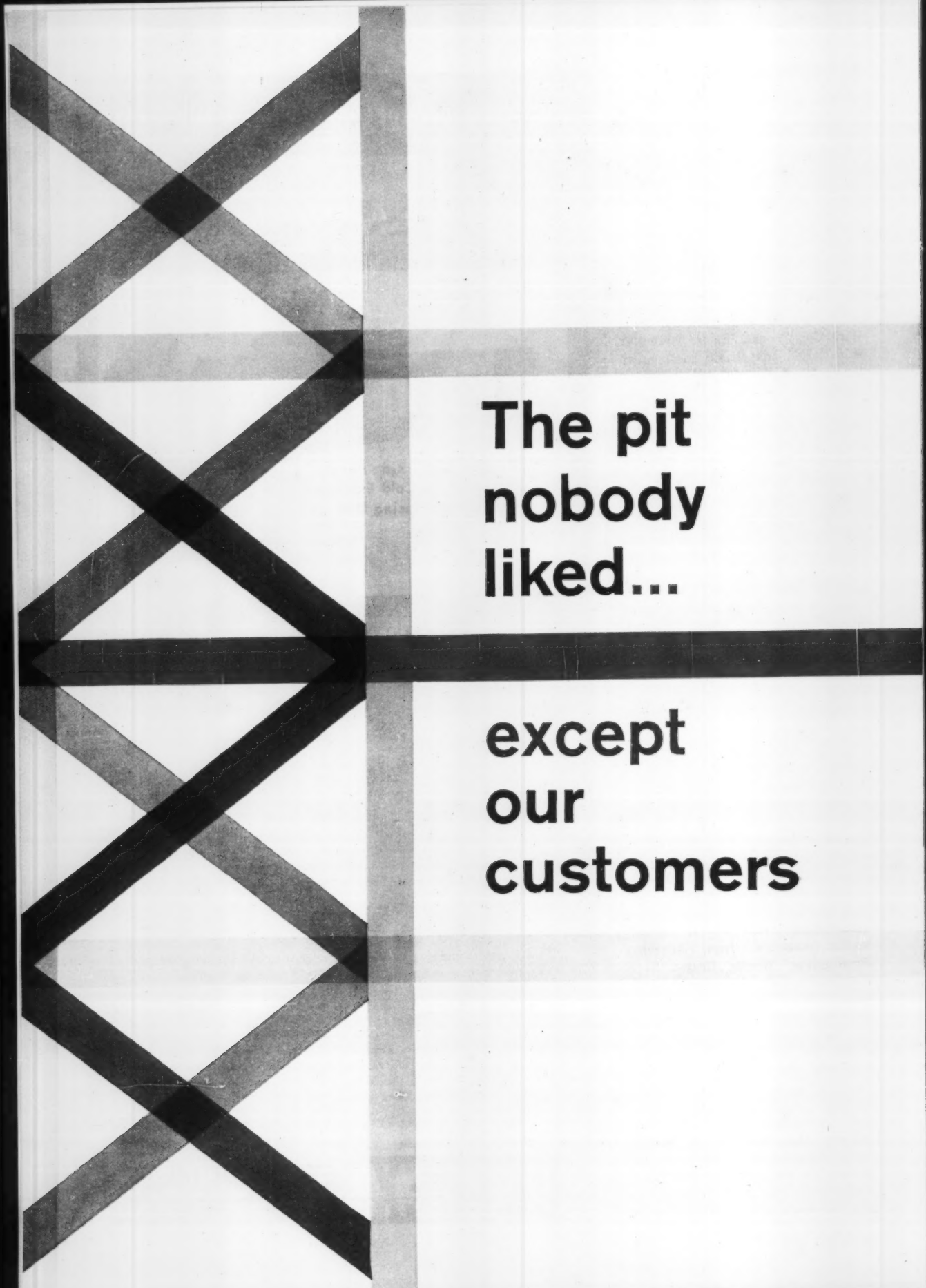
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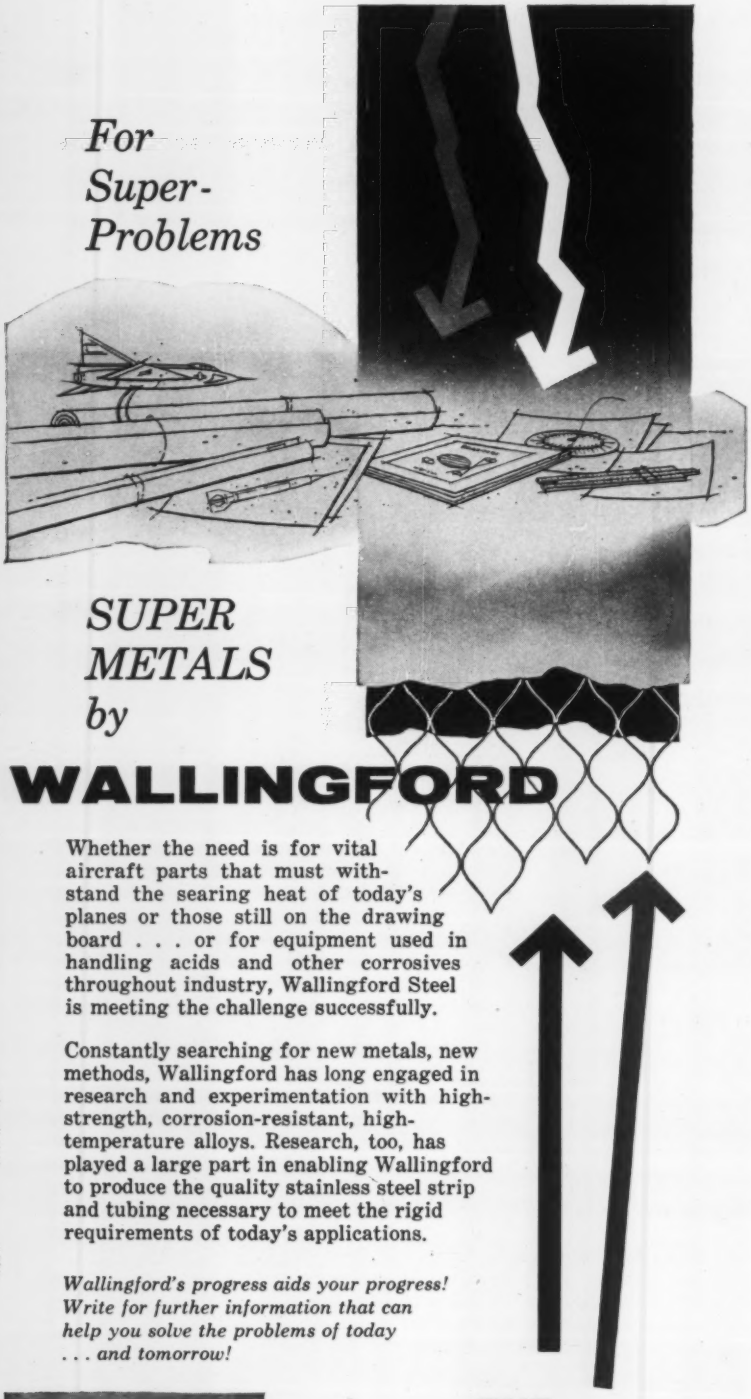

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in bosh height or the odd degree in bosh angle. Once the operator ceases to regard the bosh as sacred, his mind becomes receptive to such heretical ideas as bosh tuyeres."

Bosh Tuyeres—At Appleby-Frodingham, furnaces are constructed with one bosh tuyere between each pair of hearth tuyeres and about 9 ft above them. Their purpose is to change the air pattern to create greater flow close to the stack wall.

Mr. Elliot avers that bosh tuyere design is "as much witchcraft as everything else around a blast furnace. There is as yet no scientific basis on which to locate the tuyeres or determine their optimum size." The ones used successfully have had diameters about half that of the hearth tuyeres.

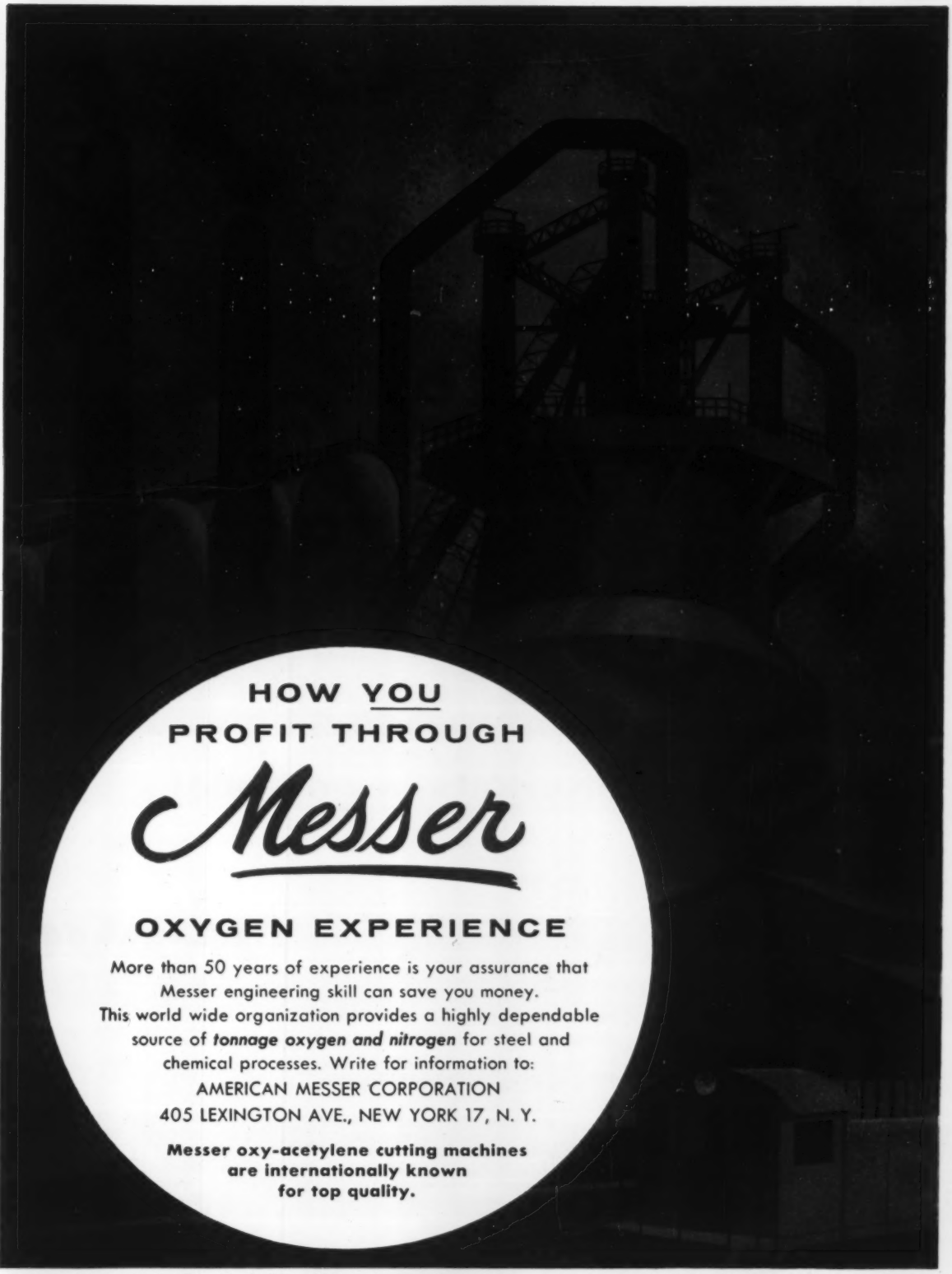
Furnaces with bosh tuyeres have shown 8 to 10 per cent increases in production. They are not new (having been used as long ago as 1907) but fell into disuse. Mr. Elliot feels their reintroduction will hasten the progress (or regression) of furnace design to higher boshes. As he says, they are not expensive, and if they prove of no benefit, it's a simple matter to clay them up.

Stack Cooling — Continuing up the stack, James Duncan, superintendent, blast furnaces, Gary Works, U.S. Steel Corp., Gary, Ind., pointed out that carbon blocks have lengthened the life of hearth and bosh. Now better methods are needed to extend the life of the stack. U.S. Steel has been trying stack cooling plates at Gary Works for this purpose.

They must meet five requirements, said Mr. Duncan:

1. Be easily replaceable.
2. Allow the brickwork to expand.
3. Cool effectively.
4. Be gastight.
5. Prevent water leaks into the furnace in the event of a burnout.

A report on ironmaking in the USSR described Russian trials with stack cooling over the last ten years. A vertical (rather than the usual horizontal) type of cooler is being tried in the lower 33 ft of the stack. In one examination of a stack, the lower coolers were found exposed but had not deteriorated.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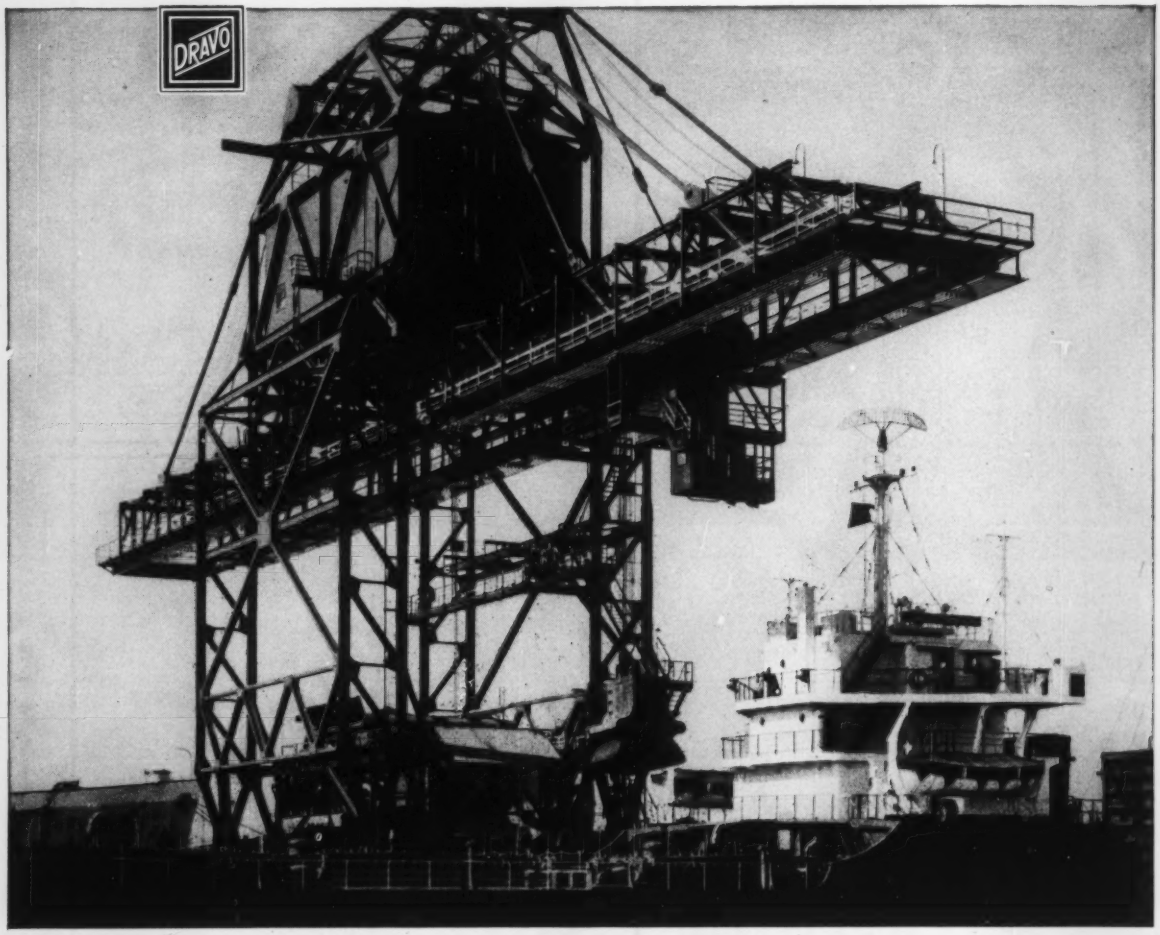

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This rugged Dravo-built ore unloader works around the clock at Pennsylvania Railroad's Greenwich Point pier in Philadelphia. A specially-designed man trolley operates the 25-ton bucket with the accuracy and speed necessary for efficient unloading.

For Pennsylvania Tidewater Dock Company, operators of the pier, this structure has meant smooth handling and increased capacity. A second ore unloader was ordered six months after the first one was installed.

Many users save time and trouble with Dravo heavy materials handling equipment. You'll find it working at many of the nation's steel plants, power plants, river and coastal depots and at other bulk transfer points. For specific help on such machinery or the other Dravo products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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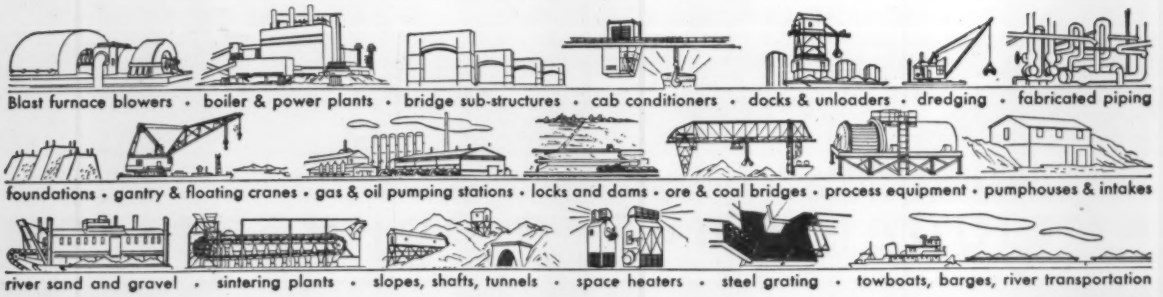
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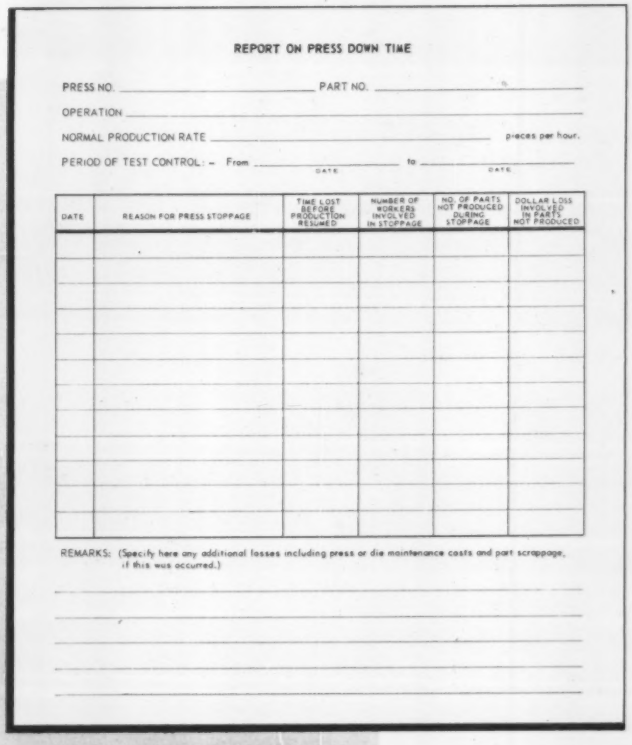
Make Your Press Department More Profitable . . .

1. **Determine why your presses stopped —excluding normal die change.**
2. **Assign this study to the management function responsible for operating efficiency.**
3. **Prepare a simple form to record the reasons for down time and the losses involved, as shown at right.**
4. **Accumulate data and review loss factors to determine the major cause and dollar losses.**
5. **Take action to reduce each major cause.**



REPORT ON PRESS DOWN TIME

PRESS NO. _____ PART NO. _____

OPERATION _____

NORMAL PRODUCTION RATE _____ pieces per hour.

PERIOD OF TEST CONTROL: – From _____ (DATE) to _____ (DATE)

DATE	REASON FOR PRESS STOPPAGE	TIME LOST BEFORE PRODUCTION RESUMED	NUMBER OF WORKERS INVOLVED IN STOPPAGE	NO. OF PARTS NOT PRODUCED DURING STOPPAGE	DOLLAR LOSS INVOLVED IN PARTS NOT PRODUCED

REMARKS: (Specify here any additional losses including press or die maintenance costs and part scrappage, if this was occurred.)

How To Cut Press Down Time

Do you know how much the stoppages in your punch press department are costing? A simple analysis will tell. Here's how to make a study in your plant

By JOHN F. BERGMANN
Sales Manager
Pivot Punch & Die Corp.
North Tonawanda, N. Y.

A LARGE automotive manufacturer slashed production losses in his press department 67 per cent after he found that punch wear and breakage were causing most of his press down time.

Another firm, the Modern Faucet Mfg. Co., Los Angeles, made a survey and found that there is a significant difference in punches. With one company's commercial punches, down time was 50 per cent less than with punches regularly used.

Loss Factors—To determine his losses, the auto maker considered these factors:

1. Cost of pieces not produced.
2. Cost of die maintenance.
3. Value of adjusting tight press schedule to avoid cost of premium time.
4. Difference in cost of additional tools.

Modern Faucet Mfg. Co. used the first two factors to determine its losses.

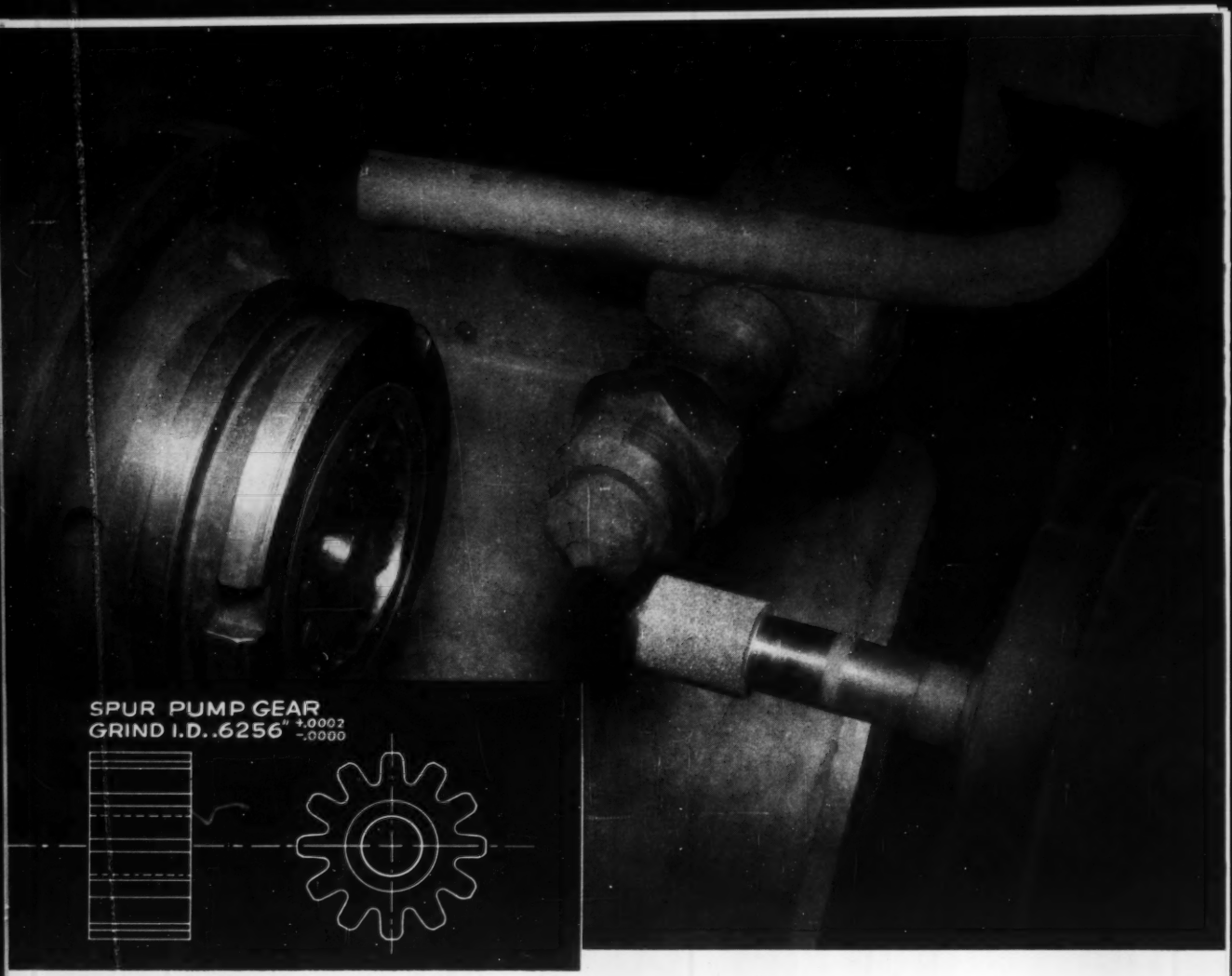
Experience — If your company wants to make its press department more efficient, follow the recommendations given above. They are based on the experience of manufacturers who have made measurable progress toward eliminating this expense.

A report on press down time should include such data as the reason for press stoppage, time lost before production resumed, the number of workers involved in the stoppage, the number of parts not produced during the down time and the dollar loss involved in the parts not produced.

Most stoppages are caused by: 1. Broken or dull punches. 2. Human error. 3. Mechanical failure of the press. 4. Failure of the die.

Punch Failure—If this is your major trouble, run performance tests on punches from several suppliers. Commercial punch manufacturers encourage them as a part of their service.

(*Please turn to page* 184)



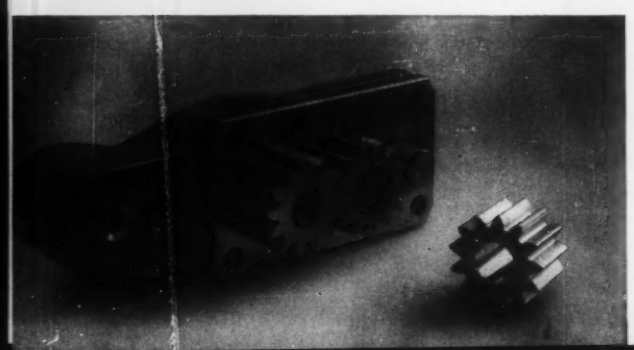
A GRINDING PROGRESS REPORT

Extra Fine Grit Silicon Carbide Succeeds in Tough Vasco Supreme I. D. Grinding Job.

One basic fact affects wheel selection for all internal grinding: Only light infeed pressure is possible. With the wheel mounted at the end of a long, slender spindle, too much pressure would cause deflection and distort the hole. The relatively large area of grinding contact further reduces the infeed pressure. Also, small wheels and high spindle speeds mean limited driving power.

On extremely hard, tough metals, the problem of finding the wheel to grind efficiently becomes critical. For harder metals it is usual to use softer grinding wheels, but there is a limit. It comes when the wheel is so soft it will not hold shape, requires frequent dressing for re-truing, and wears out quickly.

W. H. Nichols Co., Waltham, Mass., faced a challenging problem in production grinding the I.D. of spur pump gears made of Vasco Supreme, Neatro, or Ohio Air Die steels hardened to 58 - 64 Rockwell C.



Gear pumps made for the synthetic yarns industry by W. H. Nichols Co., require hard, abrasion-resistant steels.

W. H. Nichols Co. Foremen Rousseau and Burns, and Abrasive Engineer Pete Wilson checked closely on production, quality, and wheel performance with operator, during trials.

There, Bay State Distributor Engineer Pete Wilson worked closely with "Skipper" Burns, Production Foreman, and Hector Rousseau, Grinding Foreman. First, they reasoned that for these materials of high carbide content, Silicon Carbide abrasive would penetrate better and give cleaner cutting than the Aluminum Oxide being used.

They also reasoned that more cutting action would occur if more and smaller abrasive grains were cutting into this hard material. Instead of the normal grit sizes of 80 - 90, they tried grits ranging from 150 to 240.

How right they were is proved daily, in W. H. Nichols' production figures and grinding costs. Using 240 grit Silicon Carbide on the Vasco Supreme, and 150 grit on the Neatro and Ohio Air Die steels, their grinding wheels now have three times the old life. Dressing, which formerly removed .008" of the wheel each cycle, now takes only .001", just enough to keep the wheel sharp. With the extra fine grit sizes, the wheels grind more efficiently and hold shape excellently. Production schedules are being met with gears of fine dimensional accuracy, 50 or more being completed per wheel.

Top ranking abrasive engineering skills like those used in this case are available to you for your grinding. Contact your local Bay State distributor, any branch office, or the Bay State Abrasive Products Co., Westboro, Massachusetts.

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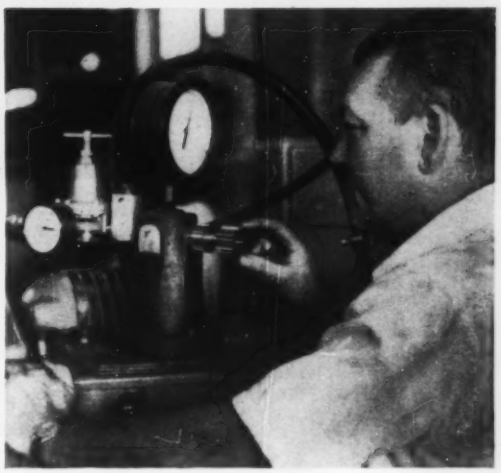

Branch Offices are located in Bristol, Conn.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Pittsburgh, Pa.; with distributors in all principal cities.

In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ont.

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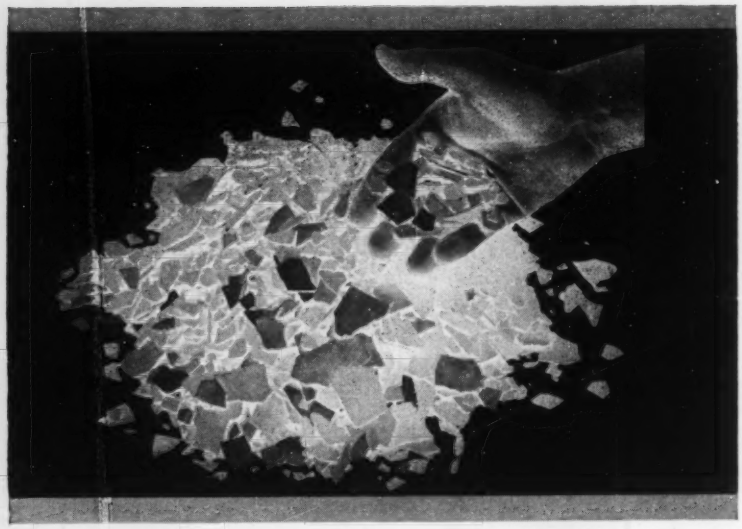

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If you want to exploit these promising new steels, one of our engineers will be glad to contribute Foote's knowledge of more than 17 years experience in electrolytic manganese alloying. A letterhead request will bring information promptly from our Technical Literature Department, Foote Mineral Company, 411 Eighteen West Chelten Building, Philadelphia 44, Pa.

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PRESS DOWN TIME . . .

A test requires proper supervision. The press operator and die setup man on each shift must know its purpose and the importance of an accurate report.

Human Error—If human failure is a major cause, pressroom supervision must be held accountable. Start an educational program for your press operators.

Many mechanical attachments reduce the possibility of human error. Investigate them.

Press Failure — If mechanical failure is the chief cause, it is recommended that you extend the accumulative costs of down time losses over a normal depreciation period. They may warrant a rebuilding program or purchase of new equipment.

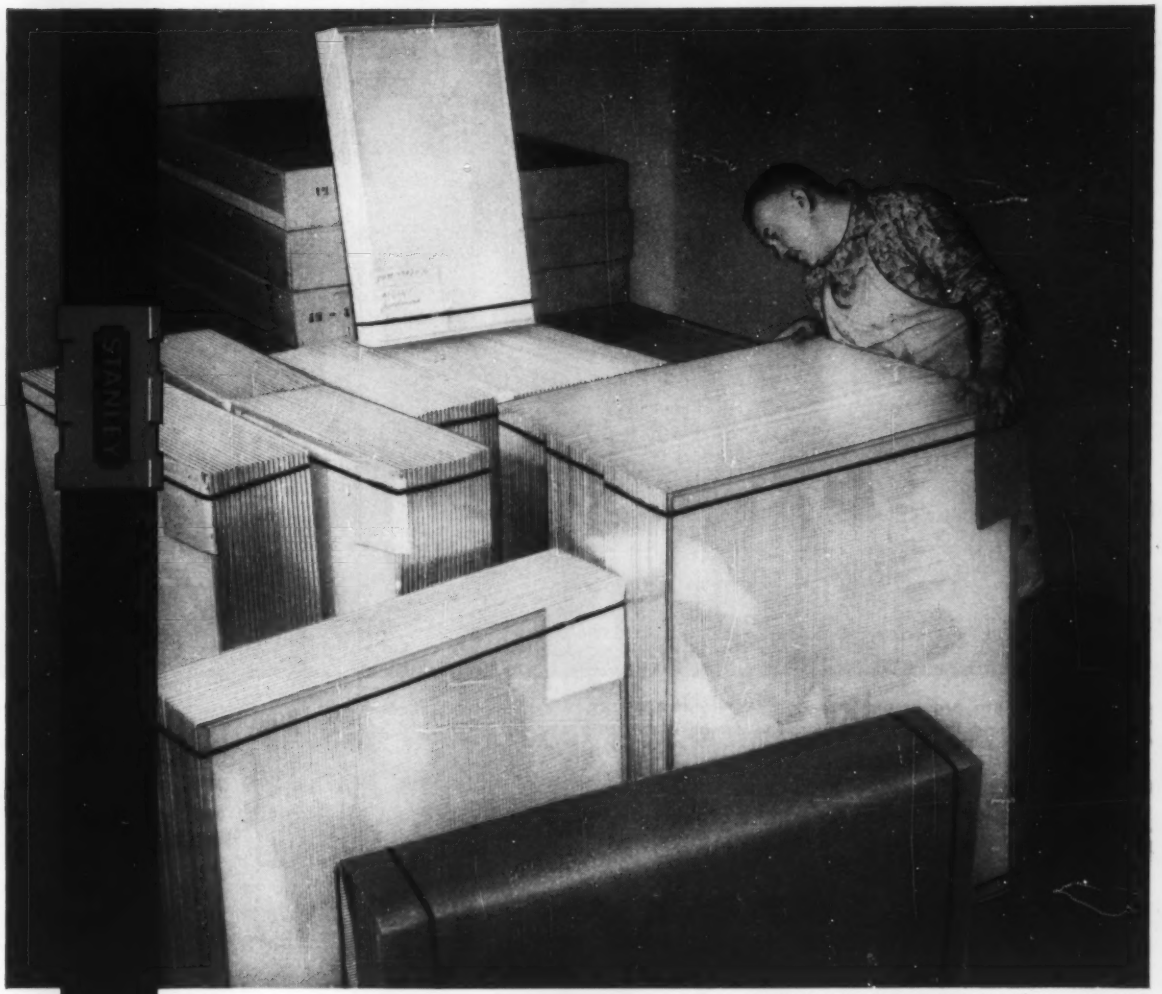
Die Failure—If this malfunction predominates, your tool design and toolroom personnel and tool vendors must be consulted and instructed. Here are a few tips on basic design.

1. No die, punch or press will perform to capacity if the punch and die are not properly aligned. Parts will burr prematurely, and punches and dies will wear excessively on one side. This will necessitate punch and die button replacement. Main causes for this malfunction are improper building of the die and lack of concentricity in the replacement punches.

2. To insure proper functioning of the die, you also must have adequate stripping pressure. Strippers with adequate holding pressure keep the part firm during the perforating and stripping cycles. This prevents cocking of the part which will cause stresses on the punch point and result in premature punch breakage.

Cost of Correction—In all cases where studies have been made, the major causes of press stoppages have been reduced by nominal expenditures, educational programs or revisions in sources of supply for perishable tooling.

The cost of a study is negligible because it only entails a co-ordinated effort by supervision and can be undertaken by the department responsible for production engineering or efficiency. The results—reduced losses and increased profits—are well worth the effort and time.



Another **STANLEY STEEL STRAPPLICATION*** on the job

"Screen Test" cuts packaging costs

Following a test demonstration by the Stanley Steel Strapping Specialist, this California company started using Stanley Steel Strapping to secure ten to twenty-five screens in bundles for shipment by truck. The packaging job is done in one-third the time and at one-third the cost of the former method. Often, the entire load is now steel-strapped to the truck.

"Far superior to our former method of enclosing screens completely in corrugated board and binding with plastic tape." That's what this manufacturer says about THE STANLEY STEEL STRAPPING SYSTEM.

Chances are the Stanley Steel Strapping Specialist can show *you* how to effect equally important savings in time and money. He'll demonstrate – on the job – the SYSTEM . . . with the TOOLS – hand or power – that can make these savings possible. WRITE FOR YOUR FREE COPY of the "Stanley Strapplication Manual of Packaging and Shipping" to STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. D, 1476 Lake Street, New Britain, Conn.

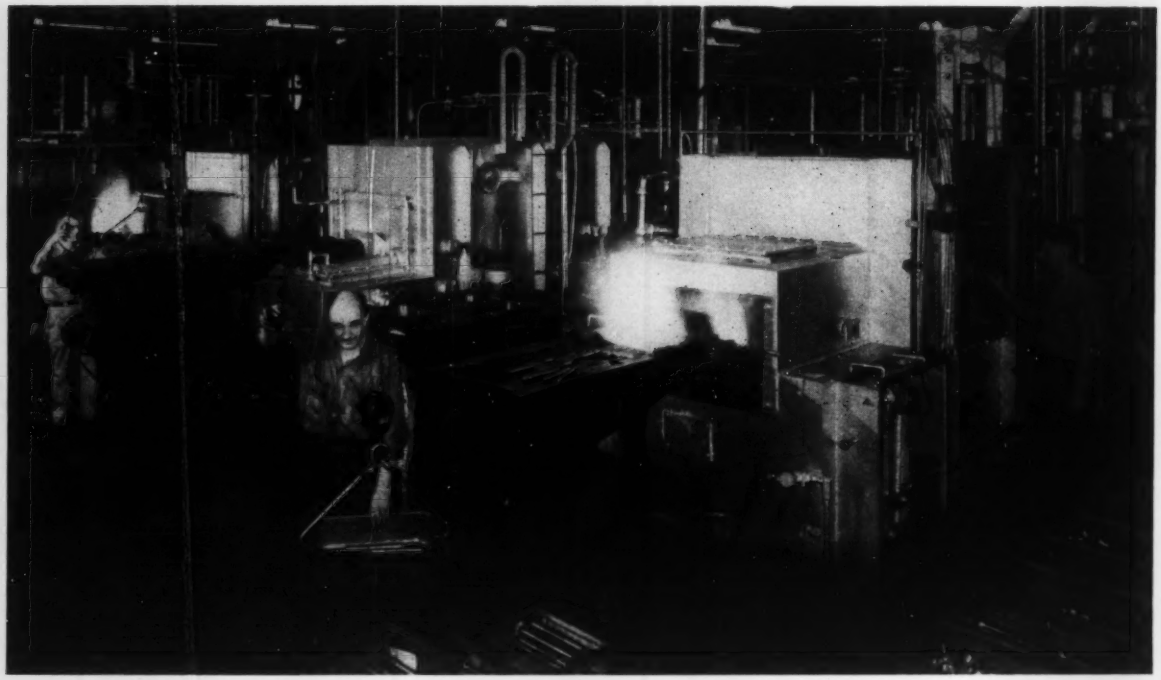
**The system-atic way to solve specific packaging and shipping problems*

INSURE IT-SECURE IT WITH STANLEY STEEL STRAPPING

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works—hand and electric tools • drapery, industrial and builders hardware • door controls • aluminum windows • metal parts • coatings • steel and steel strapping—made in 24 Stanley plants in the United States, Canada, England and Germany



Steel screws here are being loaded on a vibrator hearth which supplies an endless alloy belt running through the controlled atmosphere furnace

Restoring Carbon Cuts Fastener Failures

You can have thread troubles with ordinary bolts and screws if carbon is depleted. This fastener maker uses atmosphere control to put carbon back where it belongs

TO GET maximum benefit from a bolt or screw, you must be sure its surface is as hard as its core.

The Chicago Screw Co., Bellwood, Ill., restores lost carbon in a controlled furnace atmosphere to reduce the possibility of thread stripping and failure in critical applications.

Furnace—The firm uses gas and electric furnaces with endothermic atmospheres.

Screws and bolts are carried through the furnace on alloy steel belts fed by vibrator hearths. At the discharge, parts drop into a quench chute, pass through the quench tank on a conveyor and are delivered to tote boxes.

Depending on the type of steel being treated, it takes about 70 minutes to restore the carbon completely, while temperature is held between 1420 and 1560°F.

Combination — For quenching, oil, water and caustic solutions are used in combination to produce the physical properties needed for the several types of capscrews and bolts made.

Gas furnaces use straight RX gas produced by atmosphere generators. It is not enriched with methane or propane. Carbon dioxide and water are at a minimum; dew point, for example, is held at 15°F.

Here is the analysis of the atmosphere normally used: CO, 20.4 per cent; H_2, 40.2 per cent; CH_4, 0.4 per cent; N_2, 39.0 per cent.

Tests—Carbon balance is maintained by adjusting air-gas ratio and controlling dew points. Dew point checks of the furnaces and generators are made at 2-hour intervals. As an additional control, thin test strips are placed in the furnace and checked for change in carbon content.

The dew point in the furnace is held at approximately 50°F, since the majority of screws are made from steel with around 0.35 per cent carbon. At that level, carbon is restored to depleted surfaces to depths of 0.006 to 0.007 in., a condition often found in coils of cold-drawn steel.

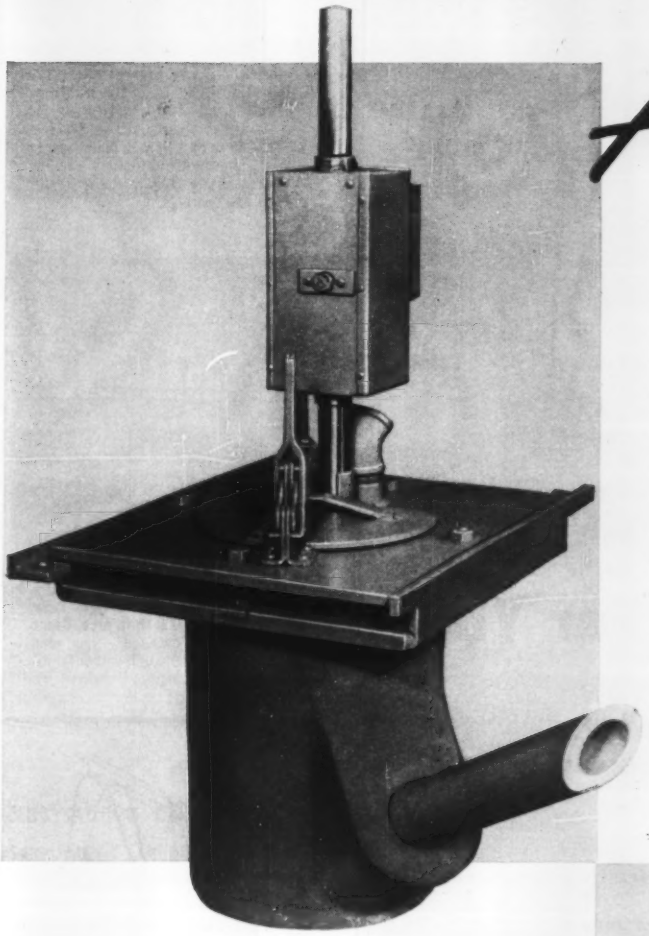
Protection—To maintain proper control, it is essential to prevent atmosphere contamination by wa-

Automatic casting of Aluminum *now practical*

with *New* LINDBERG-FISHER

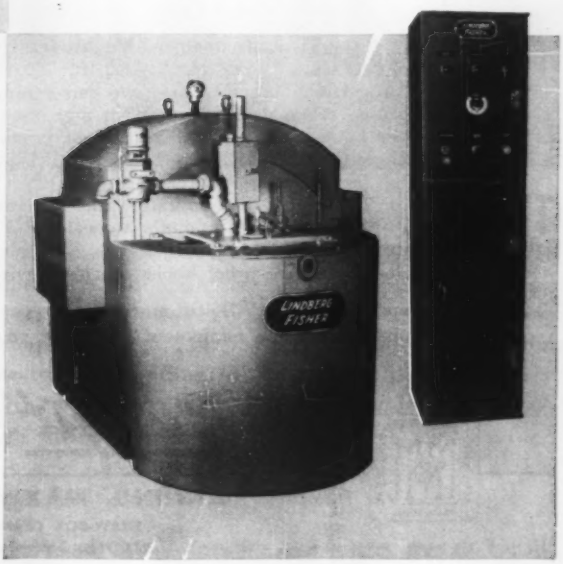
We call it "LITTLE JOE"

Autoladle



To the best of our knowledge the Autoladle is the first practical automatic aluminum ladling unit yet divised. Thoroughly tested and proven in service, the Autoladle is adaptable to induction, electric resistance or fuel fired reverberatory furnaces. In any installation it offers these advantages:

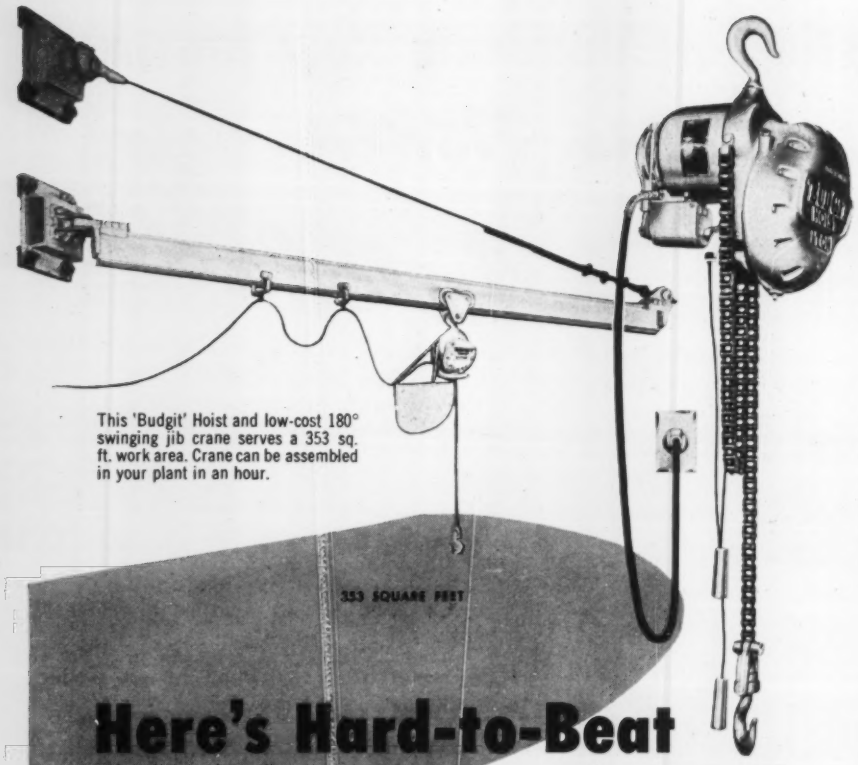
- Ladled metal is withdrawn from beneath surface of bath.
- Precise, accurate control of any size shot up to 30 lbs.
- No interruption of the casting cycle during charging of metal.
- No variation of size of shot due to metal level changes.
- Composed of special refractory materials so arranged that ladled metal cannot come in contact with any metal.



At the right, "Little Joe" is shown installed in a Lindberg-Fisher electric resistance aluminum holding furnace. With it is the panel cubicle and controls which is supplied completely assembled and wired. For complete information on the Autoladle get in touch with your nearest Lindberg Field Representative (See your classified phone book) or write us direct.

LINDBERG FISHER

A Division of Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois



This 'Budgit' Hoist and low-cost 180° swinging jib crane serves a 353 sq. ft. work area. Crane can be assembled in your plant in an hour.

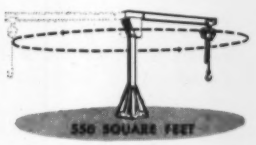
Here's Hard-to-Beat Load Handling For You!

IT'S ECONOMICAL. The 'Budgit' Hoist is the most widely used electric hoist in the world. It's simple, efficient mechanism and powerful motor provide fast lifting action. A ¼-ton load can be raised a foot in less than two seconds. Capacities range from ⅛ to 2 tons. A few cents pays for the electricity to operate any 'Budgit' all day.

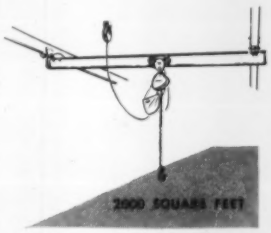
IT'S ADAPTABLE. Used alone, the 'Budgit' Hoist can serve a work area of 19½ sq. ft. To multiply the operational range of any 'Budgit' many times, we can supply a variety of low-cost jib and bridge crane assemblies. With any one of them every shop or factory can have efficient, easily-installed crane service that makes a single hoist do the work of several.

IT'S SAFE. To protect the operator, the load and the hoist itself, the 'Budgit' has automatic upper and lower safety stops; one hand control; **two** instant-action brakes, each alone powerful enough to hold the load; fracture-proof hooks; enclosed wiring — and many more.

Your "Shaw-Box" Distributor can give you full details on 'Budgit' Hoists and crane equipment . . . or write us for Bulletin 406.



A 'Budgit' Hoist on full-revolving, self-supporting 'Load Lifter' Jib Crane can serve a 550 sq. ft. area. Excellent on shipping platforms, at machine tools, in foundry molding bays. Crane bolts to floor; rotates on ball bearings.



Used with a No. 62 'Budgit' Bridge Crane Assembly, a 'Budgit' Hoist can serve a 2,000 sq.ft. area. Crane comes in a "package"—your men can assemble the unit without drilling or machining.

A 'Budgit' Hoist on a 'Budgit' Gantry "A" Frame provides economical mobile service for machine shops, service stations and places where loads must be lifted and moved anywhere in the work area.

57A-10

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Budgit'® ELECTRIC HOISTS

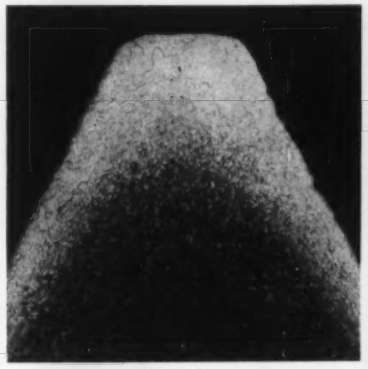
MANNING, MAXWELL & MOORE, INC.

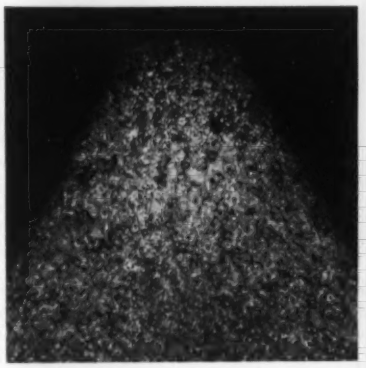
SHAW-BOX CRANE & HOIST DIVISION

384 West Broadway, Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: ***Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.***





Compare the decarburized thread (above) with one that has had carbon restored. The one below will take its full load

RESTORING CARBON . . .

ter vapor or fumes from the quenching medium. Quench chute design is important. Eductors in the chute keep the vapor out of the furnace.

The quench medium circulates at 750 gallons per minute to assure good results. A short quench (the absence of a vapor phase during the initial period of the quench) also contributes to greater uniformity and effectiveness.

Alloys—Typical steels used by Chicago Screw are SAE 1035, 1040, 4037 and 8640. Current practice is to oil quench the alloys (4037 and 8640) regardless of diameter. The carbon steels over ½-in. thick are quenched in 150°F caustic strongly agitated. Smaller sizes are quenched in oil at 400°F.

In addition to the carbon corrective properties, the carbon restoration treatment leaves parts bright and free from scale or oxide.

STAY OUT OF TROUBLE WITH A

FORGING!

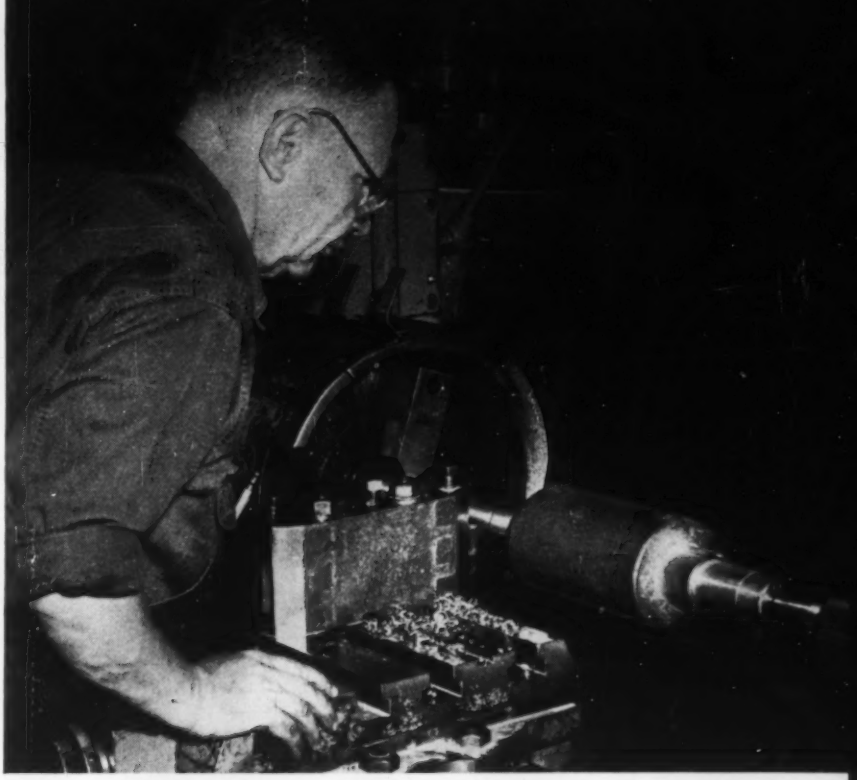


PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

closed-die **forgings** for metal you can trust

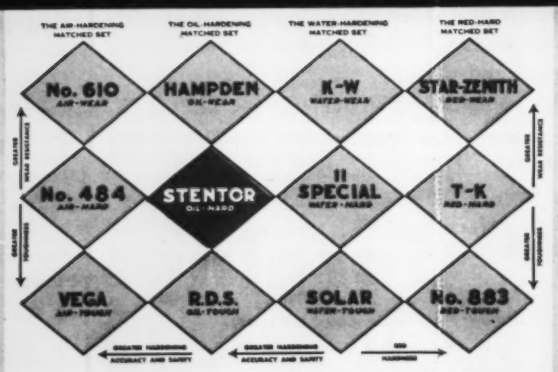
DROP FORGING ASSOCIATION

Dept. S, 419 S. Walnut St., Lansing, Mich.

Symbolic emblem of the Drop Forging Association

NOW

Once again, Carpenter Metallurgists prove their desire and ability to pace the field in developments you want and need!



® *U.S. Patent Office*

Like all Carpenter Matched Tool and Die Steels every bar of STENTOR (Oil-Hard) is colored full length in its own distinctive color for quick, positive identification! Immediate availability from your local Carpenter Mill-Branch Warehouse, Office or Distributor.

..Carpenter extends the built-in safety factor of STENTOR (oil-hard) tool and die steel!

Remarkable heat treating versatility . . .
safe, dependable hardening through a broad range of 1425°F to 1525°F

The many advantages which make STENTOR one of industry's most used and talked-about steels are affected in no way by this exclusive new development. Its simplified analysis remains unchanged. It is still the *easiest* and one of the *safest* oil-hardening steels to harden. Requires no preheating whatsoever. Hardens from a lower temperature. Assures you less size change and distortion . . . uniform hardenability . . . full freedom from decarburization . . . long, dependable service.

And NOW . . . an extended Built-In Safety Factor enables you to heat treat STENTOR tools, dies and parts either of two ways: (1) At temperatures as low as 1425°F for the cost savings this brings you . . . or (2) Place them right in the furnace with other tools that are heat treated at temperatures up to 1525°F, and eliminate special furnace runs.

If you are not already using Carpenter STENTOR, it's time to *re-evaluate* the extra advantages you get with this versatile die steel.

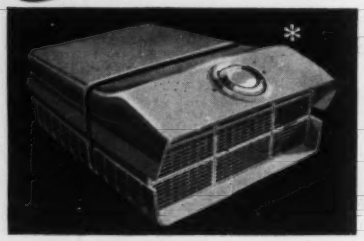
JUST PRINTED! For more facts on how you and your men can Step Ahead with STENTOR, drop us a line on your Company letterhead for this new descriptive folder.

Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Idea!

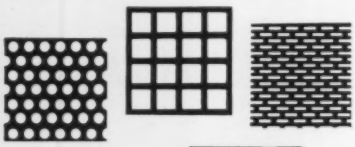


room air conditioning unit using H & K perforated metals

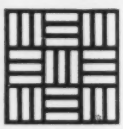
In the ¾ ton window air conditioner illustrated, perforated metals have been combined successfully with injection moulded plastics. The utilization, here, of new louvered perforated metals in adjustable frames on the frounced surface in combination with new embossed patterns on sides and under surfaces, afford rich tactile qualities hitherto unattainable in the air conditioner field.

Harrington & King perforated metals provide the Industrial Designer and other men of ideas unlimited opportunities to offer both functional and aesthetic properties as demanded in products for today's market. Contact H & K for your perforating requirements.

*Product Development by William M. Schmidt Associates



A few of the thousands of H & K perforated patterns. Illustrations are reduced in size.



Fill in and mail coupon to nearest H & K office.

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
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Chicago 44, Ill.

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Please send me—

☐ GENERAL CATALOG NO. 62

☐ STOCK LIST of Perforated Steel Sheets

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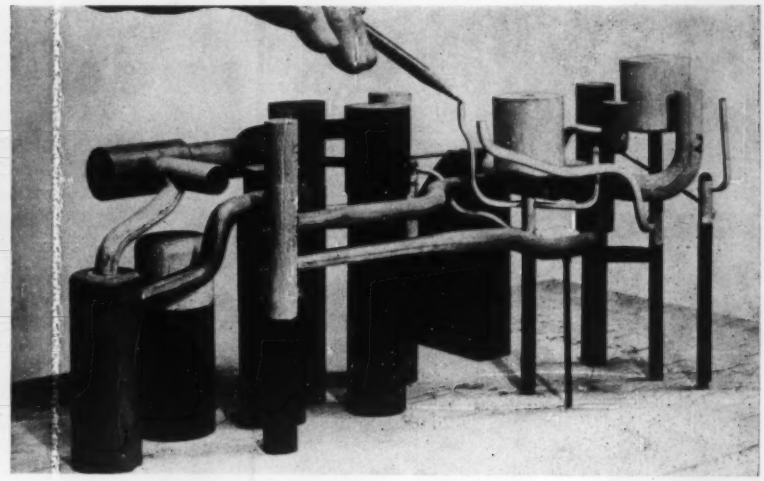
TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____



Aluminum and magnesium castings with intricate cores of small diameter like those above are now possible

Sheathed Tubing Aids Coring

Small, intricate, unlined passages in nonferrous castings are sure fire with this method. After casting, tube and sheath are easily removed

THE tip of the pencil in the illustration is touching a sheathed tube in a core mock-up of an aircraft fuel control.

The core has these advantages:

1. It makes intricate, internal passageways in nonferrous castings which were thought to be impossible to cast.

2. It's easy to use. The metal tube is removed chemically. The sheath is easily removed by hand.

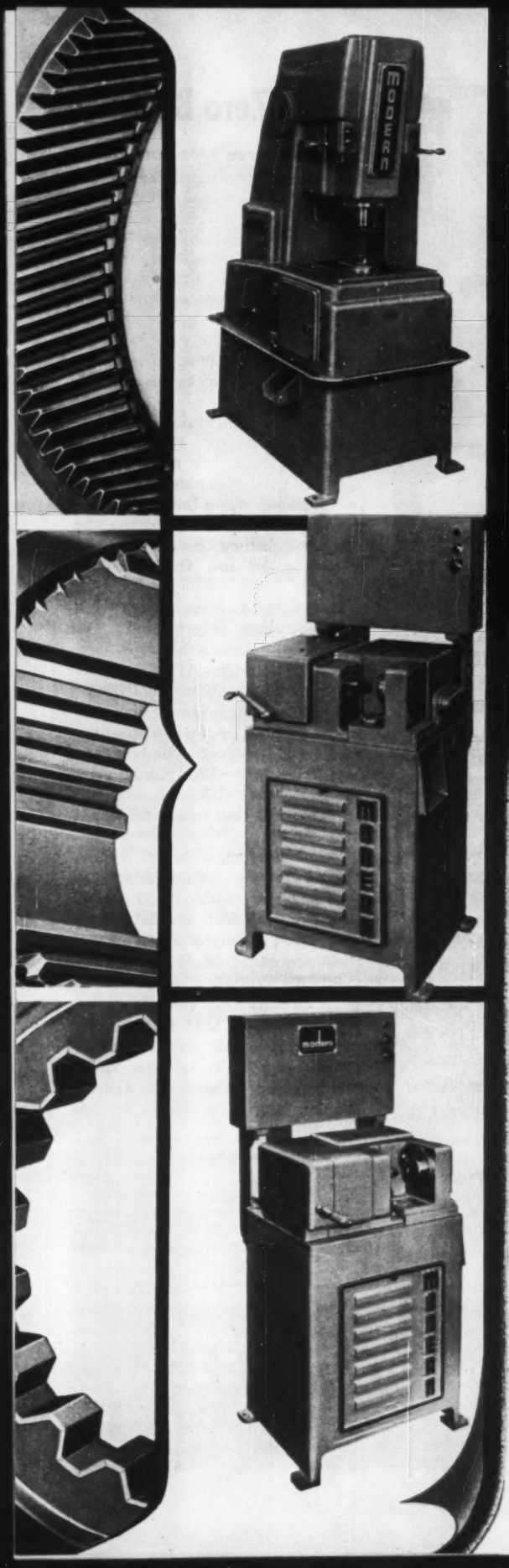
System—The core was developed by Howard Foundry Co., Chicago. Robert F. Dalton, the firm's director of research and development, will discuss the coring method at the Castings Congress of the American Foundrymen's Society in Cincinnati on May 8.

The core consists of a preformed metal tube sheathed in a flexible refractory sleeve. Both tube and sleeve are removed after casting. Aluminum and magnesium alloys are not affected by the chemical which dissolves the tube, says the Chicago firm.

The sheathed-tube core is used in combination with ordinary sand cores. It's used for passageways that are impossible to make with ordinary sand cores or when sand cores cost more.

Stability — The minimum practical sand core is about ¼-in. Anything smaller breaks too easily. Sheathed-tube cores are rigid and stable—passageways as small as ⅛-in. are common. The smallest sizes can be 16 in. long. Larger core diameters can be cast in longer lengths. There are few practical limitations to direction, and shapes can be matched to the contours of a casting. Howard Foundry is casting a 5/16-in. sheathed core that's 4 ft long.

With this method, passageways for oil, fuel, coolant and hydraulic fluids can be wrapped (internally) around a large cylinder in a continuous line. It eliminates the need for exterior fluid lines, and the bosses and drilling operations they require.



HOW MODERN CUTS THOSE HIGH DEBURRING COSTS

You know how costly removing burrs can be. **MODERN** can cut those costs for you—drastically and positively. **MODERN** Burr-Masters remove the burrs from all kinds of toothed parts—internal and external gears, splines, sprockets, clutches, etc.—leaving a smooth GENERATED chamfer over the entire contour.

High productivity is a feature of all models, averaging five teeth per second.

They chamfer-deburr so positively and so accurately that your engineers can now include dimensional deburr-chamfers on part prints and process sheets. Where functional chamfers are desired, Burr-Masters produce these while deburring—eliminating extra operations.

Here are a few of our Burr-Masters, and the types of parts they deburr. Chances are we have just the Burr-Master to suit your needs. Our sales department can provide you with complete details. Ask for a copy of Bulletin BM-156.

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Industrial Engineering Co.

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AGAIN! UDYLITE Hi-C SOLVES A PRODUCTION PROBLEM

Recently, a large supplier of nickel-plated parts was faced with the problem of doubling his production to meet the increased demands of his customers. There was no additional floor space for extra tanks or equipment.

The solution to the problem was Udylite's Hi-C Bright Nickel Process. By simply changing his 13,000 gallons of bright nickel solution to the new Udylite Hi-C Bright Nickel, the increased production was obtained.

Current densities were increased as the greater conductivity of the high chloride solution permitted higher current with no burning, even without increased agitation.

In addition, this user of Udylite Hi-C Bright Nickel Process benefited by better throwing power, which meant less nickel was used to obtain thickness requirements in recesses. Also, fewer anodes were needed since the Hi-C process provided the best anode corrosion of any nickel bath.

Why not find out what Udylite's exclusive Hi-C Bright Nickel Process can do for you? Write today for a new free folder describing Hi-C Processes for rack and barrel plating—or call your nearby Udylite representative.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Below Zero Bearings

Several oil-free types are promising for aircraft instrument use at low temperatures

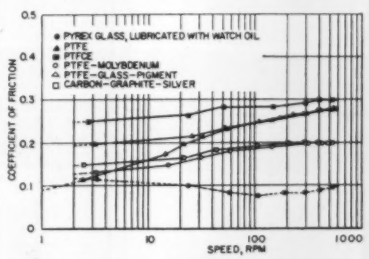
AT SUBZERO temperatures the oil in small conventional bearings congeals and impairs instrument performance. In some devices the excessive friction caused by the increased viscosity can be overcome by extra driving power—but not in aircraft clocks and similar mechanisms.

In an investigation of oil-free bearing materials, the National Bureau of Standards came up with several that promise acceptable performance. The bureau's study, headed by H. S. White of the rheology laboratory, concentrated on materials for use from −75 to 165°F.

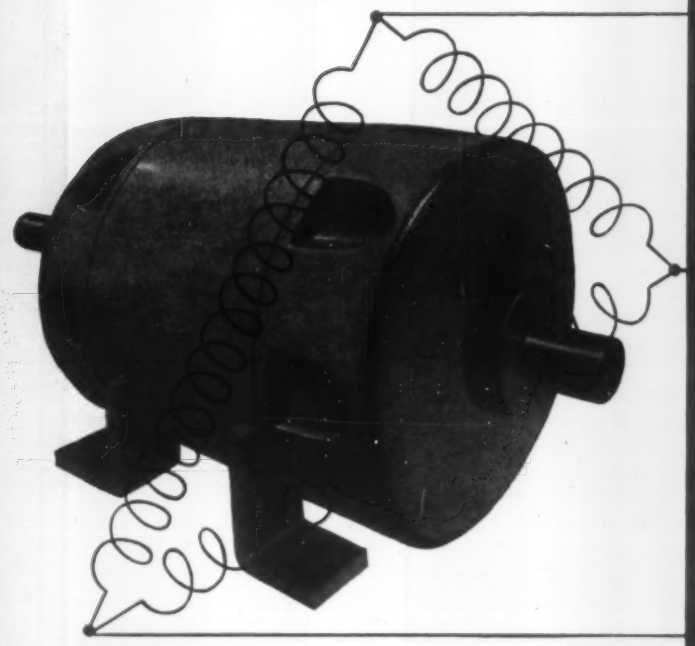
Materials—Bearings of 81 compositions were investigated. One group was plastics such as polytetrafluoroethylene (PTFE), polytrifluorochloroethylene (PTFCE) and nylon. A larger group consisted of plastics with fillers—molybdenum powder, molybdenum disulphide, graphite and glass. Compositions with different proportions of the same filler also were included.

Other materials were impregnated bronzes, impregnated carbon, bearing bronze, diamond, and sapphire. All were studied in combination with eight kinds of corrosion-resistant shaft materials.

PTFE—Wear-test data of PTFE in an aircraft clock and in a chronometer indicate that this material (without filler) is not suitable for general use. At low surface speeds and low unit pressures its wear resistance may be adequate for spe-



Effect of speed on friction for several materials investigated by the National Bureau of Standards. Data on these oil-free bearings were obtained at room temperature



SIMPLE DEPENDABLE protection against phase failure and phase reversal

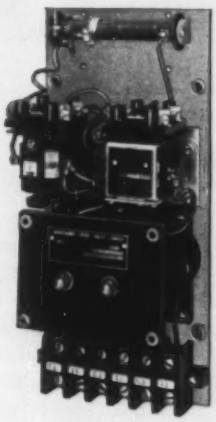
A-B protector opens control circuit in 3 to 4 cycles...under all load conditions

When men, motors, or the driven machines can be "hurt" by "phase failure" or "phase reversal" . . . the new Allen-Bradley Bulletin 812 should be used as a low cost and reliable "safety" insurance. It detects phase failures and reversals electrically, and within not more than 3 or 4 cycles, opens the motor control circuit—regardless of motor load (including no load)—and thus stops the motor.

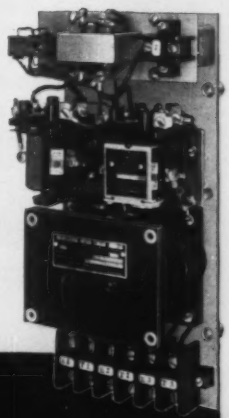
The Bulletin 812 Type A relay protects motors against all phase failures. The Type B relay protects motors against loss of a phase and reversed phase rotation. For the first time, dependable protection is provided for motors supplied by Wye-Delta and Delta-Wye power systems having the neutral ungrounded or not connected to the circuit.

Bulletin 812 relays offer positive protection against motor or machine damage due to opening a primary line—and under all "load" conditions. No field adjustment is required. Remote reset is inherent. Furthermore, as a static device which does not rely for its operation on "motor" revolution the possibility of failure to operate is eliminated.

Bulletin 812 relays are built in four sizes which will reliably protect motors with full load currents from 1.25 amperes to 300 amperes. Let us send you more information about this dependable answer to phase failure and phase reversal problems.



Bulletin 812 Type A phase failure relay protects a 3-phase motor against loss of a phase.



Bulletin 812 Type B phase failure and phase reversal relay protects a 3-phase motor against both loss of a phase and phase reversal.

ALLEN-BRADLEY
QUALITY
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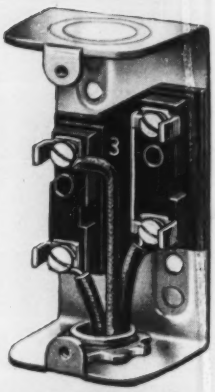
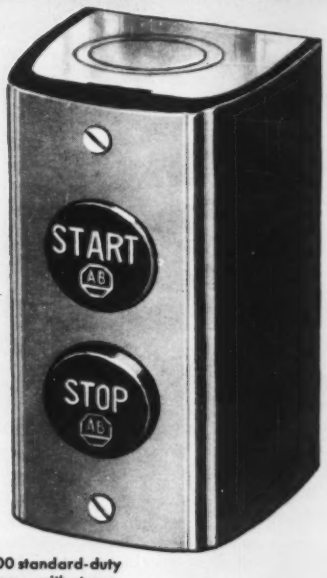
new Allen-Bradley Bulletin 800 Standard-duty Push Buttons

CAN BE WIRED IN HALF THE TIME!

CONTACT MECHANISM IN THE COVER—COMPLETELY PROTECTED FROM CARELESS SCREWDRIVERS AND CARELESS WIRING.



WIRING TERMINALS IN THE BASE —COMPLETELY EXPOSED FOR EASY WIRING.



Bulletin 800 standard-duty push buttons—with strong, gray, molded cover are "good-looking" and "safe" in operation. All stations have dual knockouts, top and bottom.

Here's an entirely new idea in push button stations—a wrap-around cover which contains and protects the contact mechanism. Removing the cover exposes all terminals for instant and easy wiring. Heavy, silver plated contacts connect the push button assembly in the cover with the terminals in the base.

Matching ribs in the cover and notches in the molded terminal base eliminate the possibility of having wiring connections made incorrectly. A molded, bakelite shield protects the contact mechanism and prevents careless wiring from interfering with contact operation. All push button contacts are silver and of the double break construction.

Specify the new Allen-Bradley standard-duty station on your next order. Its installation time-saving feature, alone, should make you a regular customer!

4-57-MR

SELECTOR SWITCH

You can't beat this for convenience—a selector switch with the same easy-to-wire construction as the push buttons, shown above—plus the feature that you can change—*in seconds*—from two position to three position (or vice versa)! The correct name plate is furnished with each switch. See for yourself how easily this is accomplished.

CHANGE IT FROM 2 POSITION TO 3 POSITION (or vice versa)...in 30 Seconds!

A-B Quality

ALLEN-BRADLEY

MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ontario

cial applications. The increase in friction below −5°F detracts from its usefulness.

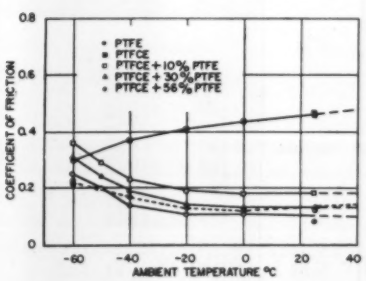
The high friction of PTFCE at ordinary temperatures and its rate of wear make it unsuitable as an oil-free bearing material. It is useful for special applications at low speeds because its friction lessens with decrease in temperature.

Filler—PTFCE with a 10 to 60 per cent filler of PTFE is one of the most promising oil-free bearing materials developed during the investigation. (The government has applied for a patent covering this type material.) It has some of the hardness of PTFCE, the friction of PTFE and wear resistance much greater than either of these plastics alone. Unfortunately, its frictional characteristics detract from its usefulness below −5°F.

Another promising material is PTFE containing molybdenum powder as a filler. It has good frictional characteristics and exceptionally good wear resistance under certain conditions. Patent No. 2,715,617 on this material has been assigned to the government.

Metal Filler—The addition of a filler to PTFE usually decreases wear greatly, but a filler of silver precipitated flowers is an exception. Although the silver particles are much less than 1 micron in size, they have a strong tendency to form conglomerations larger than 5 microns. Because of the conglomerations, it is possible that PTFE does not surround and bind the individual silver particles, and the break-up of the conglomerations may cause the high wear and friction.

Particle sizes from 0.5 to 5 mi-



Effect of temperature on friction at 3 rpm for PTFE (polytetrafluoroethylene) PTFCE (polytrifluorochloroethylene) and combinations of the two

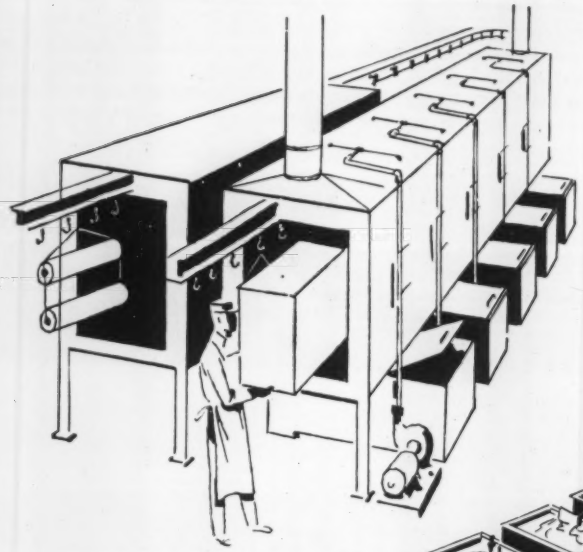
. . . check with Milford Engineers!

Riveting raises *special* problems and requires *special* skills. You must have the right type and size rivet for each application, or the results can be costly . . . in production and in profits. When you're faced with a riveting problem, let Milford engineers lend a hand before designs are fixed!

To improve product appearance and strength
. . . to take full advantage of automatic assembly
. . . to cut delivery time and production costs
—get in touch with Milford first!

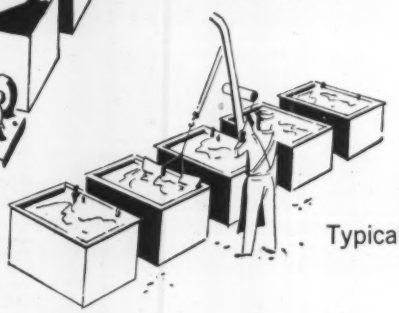
THE MILFORD RIVET & MACHINE CO.
MILFORD, CONNECTICUT • HATBORO, PENNSYLVANIA
ELYRIA, OHIO • AURORA, ILLINOIS • NORWALK, CALIF.

Treat Metals Fast and Economically with ACP *Chemicals and Processes*



Typical power spray system.

ACP produces the chemicals for treating most metals—to clean them, to prepare them for further processing, to improve corrosion resistance and paint adhesion. It has the experience and the personnel to apply these chemicals economically and effectively, too. Here are just a few of the many products and processes ACP offers:



Typical immersion system.

ACP GRANODINE®—a phosphate coating process for steel which provides an excellent bond for paint and greatly improves the corrosion resistance of the paint system.

ACP ALODINE®—an amorphous coating process for aluminum which protects both painted and unpainted metal and anchors the paint finish.

ACP LITHOFORM®—a phosphate or chromate coating process which prevents objectionable chemical reaction between metal and paint, keeps paint on zinc and cadmium surfaces.

ACP DEOXIDINE®—a phosphoric acid metal cleaner which removes rust and organic soils, destroys rusters, prepares steel, aluminum, brass, copper and other metals for painting.

ACP METAL CLEANERS—Ridoline,® alkaline metal cleaner and Ridosol,® solvent-detergent metal cleaner—remove metal preservatives and metal working lubricants from metals in process.

ACP RODINE®—pickling acid inhibitors which reduce acid consumption, save steel. They also minimize pitting, burning and embrittlement and reduce the formation of acid fumes.

Write for the "ACP GUIDE to the chemical treatment of metals."

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

New Chemical Horizons for Industry and Agriculture

crons appear to be especially suitable for fillers in PTFE compositions for small oil-free bearings. Molybdenum metal powder is readily available in these particle sizes.

In general, metal-impregnated carbon materials showed good friction and wear characteristics. Their low coefficients of thermal expansion are an additional advantage and their good electrical conductivity may be useful. Relative coarseness of the structure discourages the use of such materials for bearings under 1/16-in. bore.

Sapphire—No material proved as satisfactory as sapphire for pallet stones in timepieces. Sapphire would be suitable for unlubricated endstones when the load is relatively light, especially in timepieces that normally operate in an upright position. Unlubricated sapphire hole bearings (jewels) caused rapid wear or rusting of balance-staff pivots in timepieces.

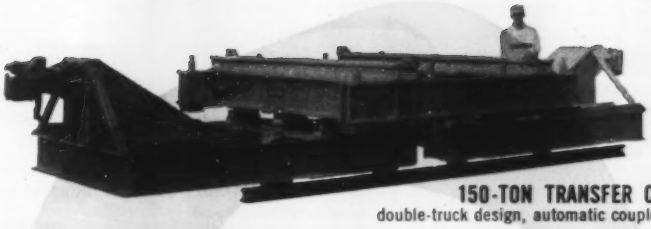
Porous bronzes, examined under the stereomicroscope, revealed pores and sections of solid bronze that were much larger than the diameters of common balance-staff journals. This would make impregnated porous bronze impractical for such journals. For larger journals, friction and wear data for porous bronze impregnated with PTFE and with molybdenum disulphide discourage its use for an oil-free bearing in aircraft.

Unsatisfactory—Characteristics exhibited by boron carbide without lubrication appear to make it unsuitable for pallet stones or journal bearings. Ordinary brass and bearing bronze also appeared unsuitable.

Machining Data on Stainless

A pocket-size slide chart on machining stainless steels is available from the Carpenter Steel Co., 339 W. Bern St., Reading, Pa. One side gives data on turning, drilling, tapping, threading, milling and reaming; tabulates speeds and feeds; and gives notes on drilling, tapping, lubrication and welding.

The other side of the chart shows relative workability of stainless steels in blanking, deep drawing, stamping, forging, heading, roll threading and welding.



150-TON TRANSFER CAR
double-truck design, automatic couplers.

TRANSFER CARS

CUSTOM-BUILT and quality-built to suit requirements. For locomotive haul or self-propelled. Engineering counsel is provided to assist in the design and application of EASTON custom-built cars for all types of service.

Write or telephone for technical information.

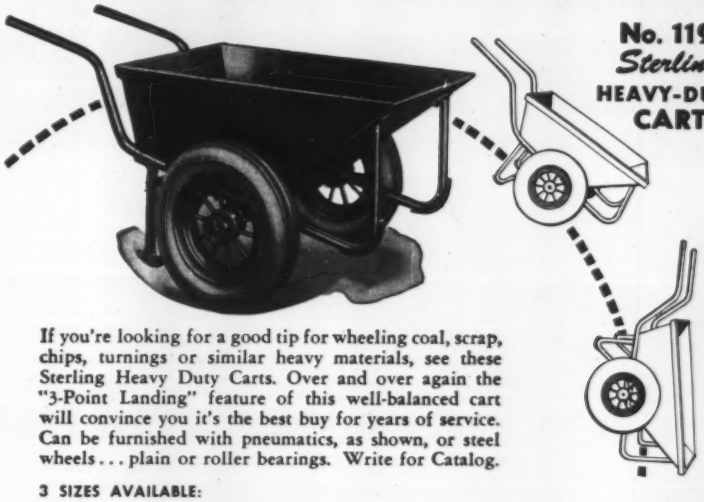
150-TON TRANSFER CAR
designed to negotiate a 300' radius curve.

OUR 43RD YEAR

EASTON
EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

A-1085

YOUR BEST *Tip* IN CARTS



No. 119 *Sterling* HEAVY-DUTY CART

If you're looking for a good tip for wheeling coal, scrap, chips, turnings or similar heavy materials, see these Sterling Heavy Duty Carts. Over and over again the "3-Point Landing" feature of this well-balanced cart will convince you it's the best buy for years of service. Can be furnished with pneumatics, as shown, or steel wheels . . . plain or roller bearings. Write for Catalog.

3 SIZES AVAILABLE:

No. 119..... 7½ cu. ft.
No. 120..... 9 cu. ft.
No. 121..... 11¼ cu. ft.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

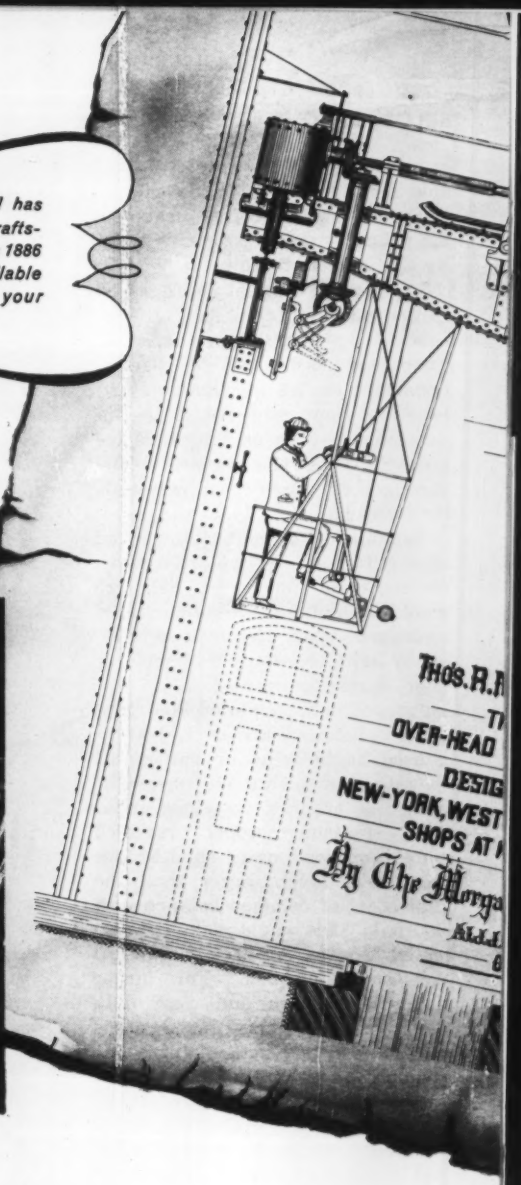
A HALF CENTURY OF PROGRESS

Sterling WHEELBARROWS

Look for this Mark of STERLING Quality

Since 1868, *the name MORGAN has stood for advanced design and trusted craftsmanship. A 14" x 20" reproduction of this 1886 patent drawing of a 35-ton crane is available for framing. Kindly send request on your company letterhead.*

CONTRAST *the controls of 68 years ago—pull ropes that engaged clutches on square shafts and a foot brake—with those of the modern Morgan crane. Today the operator rides in air-conditioned comfort. His controls automatically suit themselves to handling conditions, assuring maximum speed, safety and accuracy.*



Time Counts

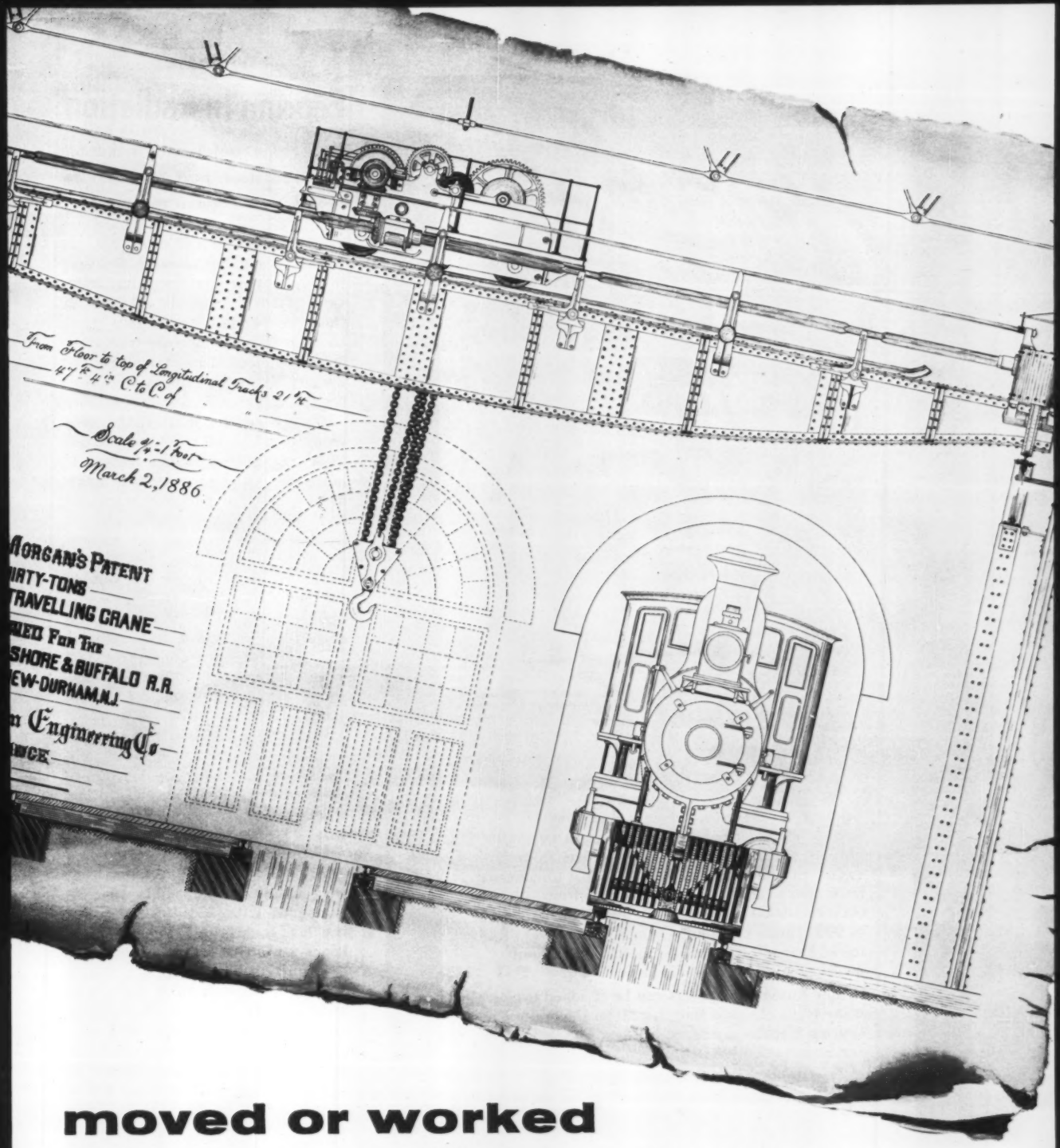
...wherever metal is made,

Speed production, cut costs, with Morgan Cranes and Mill Equipment

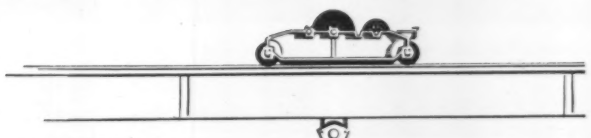
Advanced design and trusted craftsmanship are 89-year old Morgan traditions... important characteristics in the cranes, mills, chargers, and shears which must do the big, tough jobs in today's steel mills.

Since 1868, Morgan equipment has been used at the vital spots in maintaining continuous, lower cost production. Years of close contact with metal-producing problems and farsighted research have resulted in a steady flow of mill equipment improvements... greater speeds and efficiency, greater capacities, lower operating and maintenance costs wherever you see the nameplate, "Morgan—Alliance, Ohio—U.S.A."

Let our representative show *you* how time counts in increasing production and profits . . . with Morgan equipment.



moved or worked

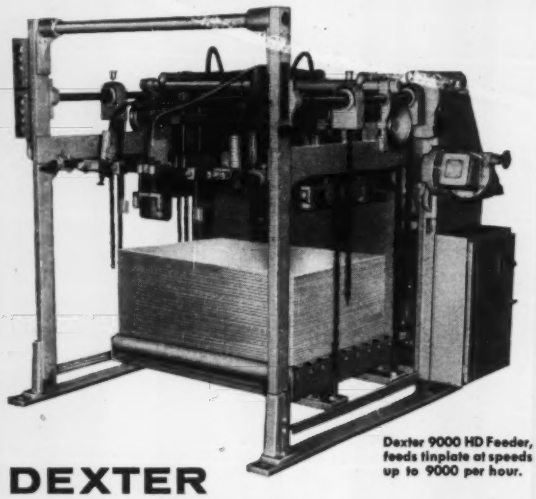


THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws and auxiliary equipment.

Automatic Feeding

FOR SHEET METAL PROCESSING



Dexter 9000 HD Feeder, feeds tinplate at speeds up to 9000 per hour.

DEXTER

automatic **METAL** *sheet feeders*

Dexter Feeders are available in over a hundred different sizes, speeds and load capacities to suit individual requirements. Look at the wide range of the Dexter Line . . . sheet sizes from 14x14" to four by twelve feet . . . sheet thicknesses from .006 to .200 . . . load capacities from 6000 to 30,000 pounds . . . and speeds from 600 to 9000 sheets per hour! Certainly there's a model that will fit your operation, and without doubt, step up your production.

Dexter Automatic Feeders can be attached to many types of equipment . . . Metal Decorators, Coating Machines, Shears, Slitters, Punch Presses, and numerous others.

If sheet feeding is one of your production bottlenecks, give us the details. We'll be happy to tell you what we can (or can't) do for you.

Designers of sheet handling equipment for over 75 years

DEXTER **FOLDER COMPANY**

DIVISION OF MIEHLE-GOSS-DEXTER, INC.

219 East 44th Street, New York 17, New York

Fencing In Radiation

Two large weldments make up the treatment port shutters on reactor for medical research

THE APPLICATION of atomic reactors to medical research is opening up a new metalworking market. There's evidence of this in the two 42,500-lb shutters that control thermal nuclear radiation from the medical reactor at Brookhaven National Laboratory, Upton, N. Y.

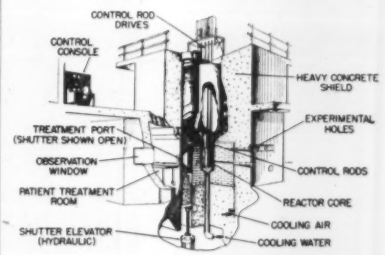
By closing the shutter, the neutron beam can be quickly shut off. This arrangement makes treatment more flexible and provides maximum safety for patients, scientists and technicians. Previously, it was necessary to build the reactor up to strength before the experiment began and let it die out at the end.

Construction—Each shutter assembly is a welded half-cylinder casing in which a concentric half cylinder moves. Shutters are placed on opposite sides of the reactor.

Both the inner and outer cylinders have square openings. When these are matched, the shutter is open and radiation can proceed through a treatment port into the patient's room.

Shielding—The inner cylinder is filled with heavy concrete (it weighs 280 lb per cubic foot as compared with 130 to 140 lb for regular concrete). The concrete keeps radiation from penetrating the shutters when they are closed.

Each shutter is 15 ft high, 4 ft wide and 31 in. thick at its midsection. A shutter filled with concrete weighs over 21 tons. It must move from completely closed to



Only one of the two control shutters is shown in this cutaway of the reactor. The second is directly opposite the one that is visible

Another example of THERMALLOY quality control at work*

PREVENTIVE THERAPY

...the next "patient" can be your casting

Trained radiographers x-ray Thermalloy castings, such as pots and muffles, completely . . . not just at points of expected stress. *All* Thermalloy castings must pass x-ray inspection, surface tests or pressure tests, where experience indicates that stress can be normally expected.

Let us work with you on heat-treat problems. Our engineers can help you select the right grade of Thermalloy high-heat-resistant alloy and proper casting techniques for your particular application. Electro-Alloys has complete metallurgical and physical test labs, and works closely with the extensive headquarters research facilities of American Brake Shoe Company.

Call your nearby Electro-Alloys representative, or write for Thermalloy application bulletin T-225. Electro-Alloys Division 8044 Taylor Street, Elyria, Ohio. *Reg. U. S. Pat. Off.

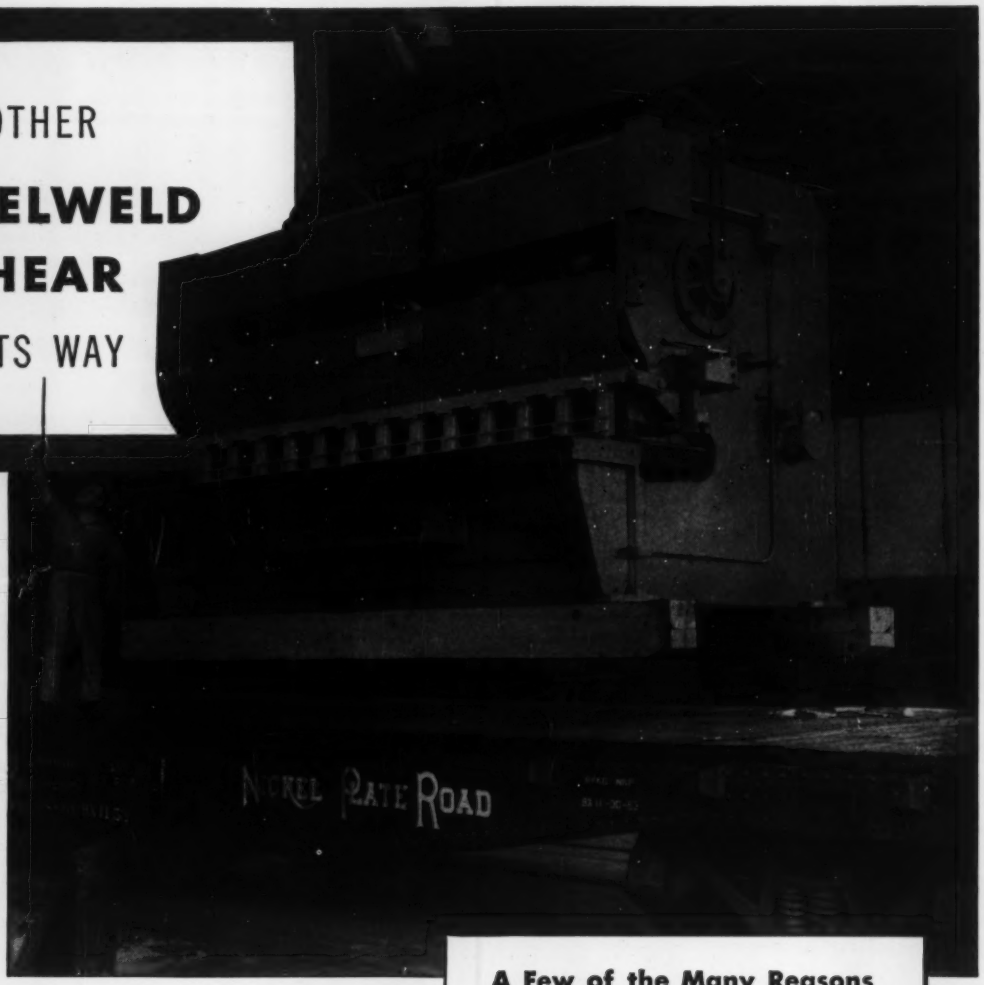
HEAT-RESISTANT CASTINGS • RADIANT TUBES
MUFFLES • RETORTS • CONVEYOR BELTS • TRAYS

AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** Elyria, Ohio

ANOTHER

STEELWELD SHEAR

ON ITS WAY



From every angle a Steelweld shear looks good — and is good. This machine is rated for 12'-0"x½"steel

SHIPMENTS are being made at a rapid rate to all parts of the country because more and more users are learning of the many merits of Steelweld Shears and are talking about them. As the words of experience spread about and comparisons are made, more and more people come to realize that Steelweld Shears are really outstanding.

For smooth, accurate burr-free cutting, Steelwelds can't be beat. For ease of operation they have no peer. Their heavy construction and means for simple, easy maintenance assure long trouble-free life.

For the finest in shearing, you can't make a better selection than Steelweld. Say the word and we'll have one of these wonderful machines on the way to you.

A Few of the Many Reasons For STEELWELD'S DEMAND

1. Pivoted-blade operation. Entirely different from every other shear. No slides or guides to wear and cause inaccuracies.
2. Micro-set knife adjustment. Quick easy knife-clearance adjustment for every plate thickness. Something not matched elsewhere. Be sure to get the complete story on this.
3. Mechanical hold-downs. Tight gripping, non-leaking, quiet operating.
4. Accurate easy operating back gauge rides on ball bearings.
5. Cool-operating, long-life, low-inertia clutch and brake.
6. Heavy all-welded rigid one-piece steel frame.

AVAILABLE FOR PLATE LENGTHS TO 24 FEET AND THICKNESSES TO 1½ INCH

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7851 EAST 282nd STREET, WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

completely open in 10 to 11 seconds—a speed of 30 fpm.

Hydraulic System—An 8-in. hydraulic cylinder under 1000 psi pressure raises each shutter. There are two pumps for each shutter—one high-volume unit that pumps 70 gpm and one low-volume unit at 12 gpm.

The high volume pump gives the speed needed to lift the shutter at 30 fpm. Before the last 2 in. of shutter movement, the high-volume unit cuts out and the low-volume pump decelerates the shutter and supports it in its lifted position.

Interlocks — An interlock prevents the second shutter from rising until the first one is fully open. Then, switches release the interlock and permit the first pumping unit to raise the second shutter in the same way it raised the first. A check valve prevents drift of the first shutter while the second is being raised.

Either pumping unit can raise both cylinders. The two units and the two lifting cylinders are interconnected. There is no provision to run both units at the same time to lift the shutters simultaneously.

To lower the cylinders, a technician depresses a button which de-energizes the solenoids of a four-way operating valve and permits the shutter to move down by gravity. Downward speed is controlled by the size of the orifice through which oil leaves the lifting cylinder.

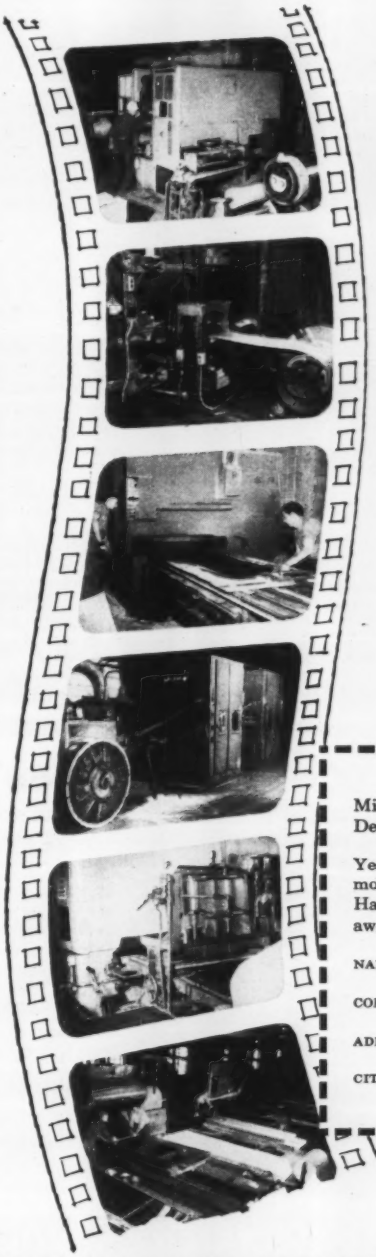
Concrete — The heavy concrete used in the shutters is a mixture of portland cement and an aggregate of specially sized scrap steel and limonite (iron ore).

Emplacements of the heavy cement will surround the entire reactor unit to prevent any radiation escape. The shutters will be operated by doctors from a console near shielded windows which view the treatment ports.

Construction of the shutter system was the work of several companies. The Eddystone Division of Baldwin - Lima - Hamilton Corp., Philadelphia, built the large weldments. The Racine Hydraulics & Machinery Co., Racine, Wis., made the pumping units. Lift cylinders were built by the Tompkins-Johnson Co., Jackson, Mich.

Announcing an important new motion picture for

Primary Metal Industries



If you manufacture, process or fabricate *any* of the primary metals, you'll want to see the brand new full-color sound movie, "A CHALLENGE FOR STEEL", prepared especially for the primary metals industry by the 3M Company—world's largest producer of industrial coated abrasives. You'll find this movie packed with cost-saving tips, helpful information about coated abrasives. Contact your 3M Representative today for a free showing. Or send coupon below.

Minnesota Mining and Manufacturing Co.
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Yes, I want to see your primary metal movie "A CHALLENGE FOR STEEL". Have a 3M Representative contact me right away.

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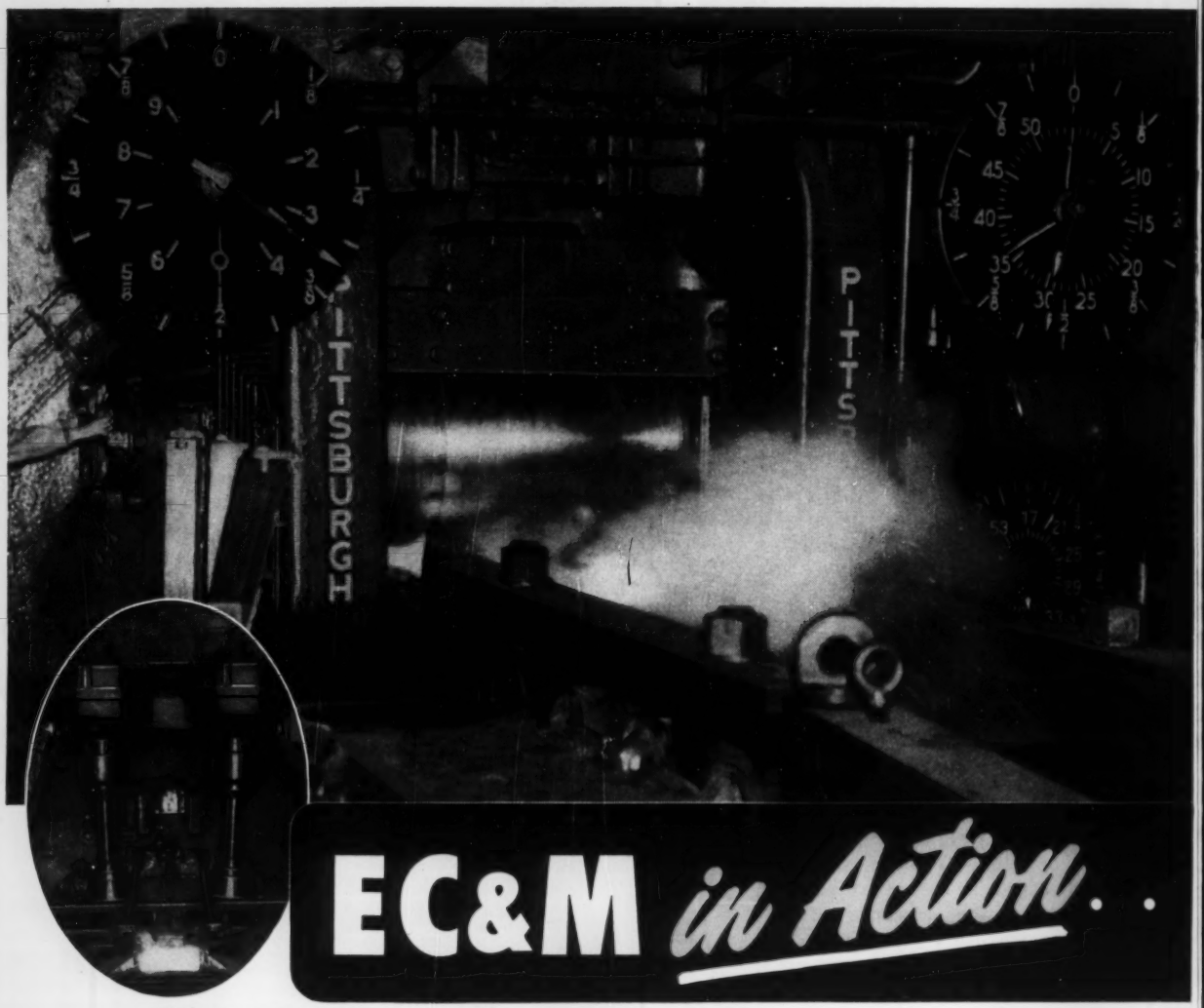
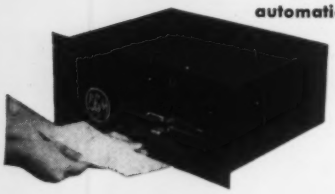


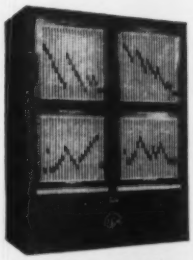
EC&M *in Action . . .*

Slab entering mill between edger rolls.
Top photo shows rear view of mill

SCHEDULING NOW AVAILABLE
By Punched Cards or Slider Panels

at left • **Punched Card Reader automatically signals roll setting for each pass**





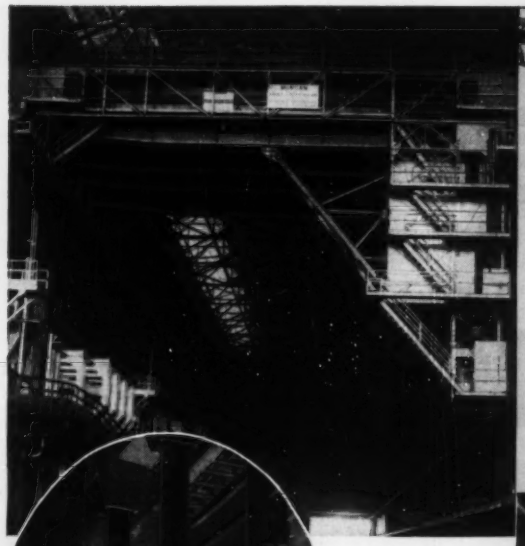
at right • **Slider Panel provides roll settings for 2 complete schedules. Pistol-grip switch provides immediate transfer from one to the other**

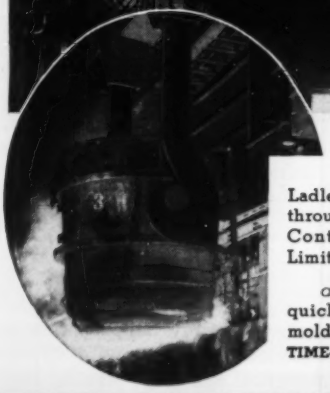
ON THE JOB SINCE 1952

WORK ROLLS, VERTICAL ROLLS and **EDGER-ROLL GUIDES** on the above Reversing Roughing Mill are positioned automatically on each pass, by pushbutton, under **EC&M AUTOMATIC-POSITIONING** Screwdown Control. One roller controls this mill's operations in which-roll settings are pre-set on direct-reading contact panels. Alternate new method is by **PUNCHED CARDS.** Both of these EC&M systems provide maximum flexibility of screwdown operation.

For the complete story, write for Bulletin 6550

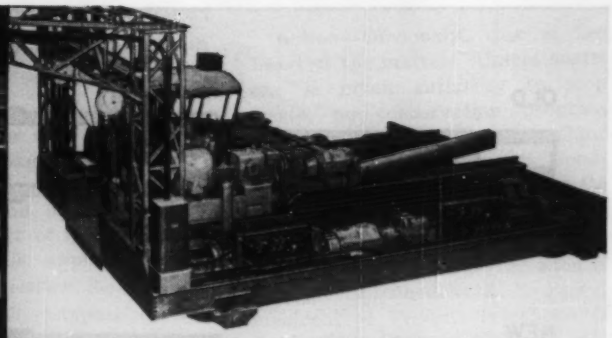
THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO





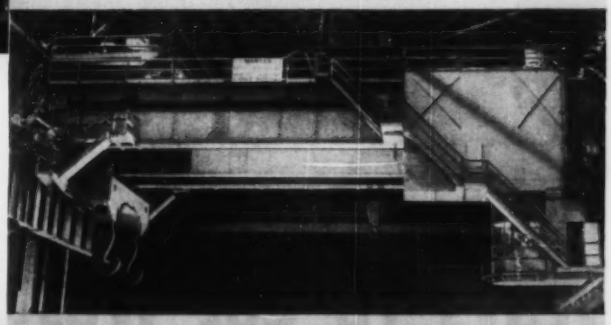
above • 350-Ton Ladle Crane equipped throughout with EC&M Control, Brakes and Limit Stops.

at left • "Jumping" quickly from mold to mold is easy with EC&M **TIME-CURRENT** Control.



above • EC&M Disconnect Switch, low headroom Controllers, and WB Brake provide efficient control of this Charger.

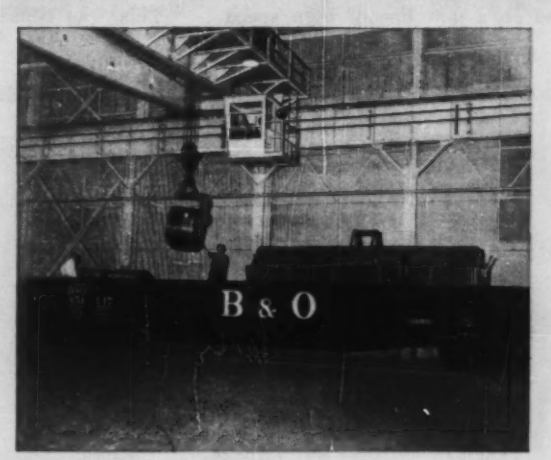
below • Hot Metal Charging Crane is 100%-SAFELY operated under EC&M Control.



. . AT DETROIT STEEL

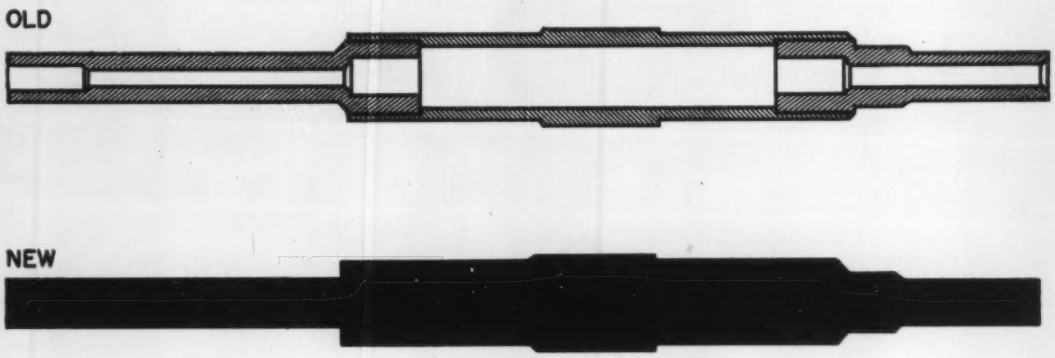
Modern Screwdown Control & Relay Panel

Compact, *factory-assembled* control is completely wired. At left is **TIME-CURRENT** Controller for controlling movements of screwdown motors. Right section of panel contains Relays and Magnetic Amplifiers. Tap Switches on front provide convenient adjustment for best balance-anticipator operation — thus providing quick, accurate stopping of rolls.



Mill Crane, under EC&M Control, loads outgoing shipments into railroad cars with maximum safety and dependability.

8456



Two armature shaft designs from Jack & Heintz Inc., Cleveland, illustrate the relative nature of conservation. In this case, the built-up, hollow shaft conserves weight; the solid shaft saves manufacturing time and the cost of a premium material

Ways To Cut Waste

JACK & HEINTZ Inc., Cleveland, was fabricating the hollow armature shaft above from machined seamless tubing. It was a good, weight-saving method, but when tried on a new line of high speed armatures, vibration developed. The company found it necessary to go to a solid shaft—with savings per shaft of $1.40 for material and 8.4 minutes for labor.

This was conservation by accident. It rarely happens this way. Like most good things in life, conservation has to be worked for.

Official—Realizing this, the Department of Defense actively promotes conservation (and has for many years). Secretaries of the military departments are directed to: "Undertake a positive program to foster the co-operation of military contractors and subcontractors in conservation of materials in military production."

Conservation Check List

DESIGN

Could a change from diecastings to stampings—or the reverse—cut production costs?

Would a change in design make it possible to use automatic heat treating, brazing or welding?

Could you eliminate special grades and custom jobs by designing a more nearly universal product?

Would a switch from machining to powder metallurgy, or from removing metal to moving metal, bring savings in production and assembly?

Could you lessen quality without losing sales?

EQUIPMENT

Are parts being subcontracted while your own machines stand idle?

Would a slight change in part shape or materials make it possible to avoid the purchase of new machinery?

Do you have a "Mr. Conservation" in your plant? It takes a mandate from management and authority centralized in one person to set up a program that really works

The air materiel commands, especially, have been active in the five Ms of conservation—materials, manpower, methods, machines and money. But a sixth M (men) is needed to make any program a success.

How do you sell conservation to the man who manages a plant and the man who runs a machine?

First—There's the appeal to conscience. We are warned that we are depleting our natural resources at an alarming rate and must find ways to make them last longer. This makes sense. There are plenty of people who fight waste simply because it is the right thing to do. But, by and large, conservation through conscience is fine for the other fellow.

Second—There's the pressure of military necessity. This makes itself felt in government stockpiling and allocation programs. Because critical materials are hard to get and are in the spotlight, their conservation should be a matter of course. Unfortunately, it isn't. One company, for instance, preferred to use nickel-bearing stainless instead of an alternate material because the value of the nickel-bearing scrap was so high.

Third—There's the lure of saving money. This kind of conservation appeals to most people because it cuts the cost of a product without impairing quality, or lowers the tax bill. The government has had a good deal of success keeping the cost of military items down with this approach. But some people question it.

Dissent — The appeal to the pocketbook stirs up the wrong emotions in the opinion of V. P. Campanella, senior industrial engineer of the Jet Division, Thompson Products Inc., Cleveland. It's too likely to bring the reaction: "What's in it for me?" To Mr. Campanella, conservation is a human problem, to be solved in large part by developing enthusiasm in the labor force.

How do you accomplish that? One method, he says, is to listen. Men know waste when they see it. They talk about it, but unless supervisors are encouraged to listen, the grumbling never gets beyond the shop floor. He suggests a serious listening program.

This open-ear policy is obviously the familiar suggestion system without the paper work and the prizes. But it works. In six months, workers at the Thompson Jet Division brought up 979 questions and problems of real importance. They had no more incentive than the knowledge that the foreman was interested and would see that something got done.

Action—Obviously, this is the heart of the matter. Unless someone is given authority to stop waste, no conservation program gets to first base. In a big plant this can be a full time job. Goodyear Aircraft Corp. recognized its importance with the appointment of a conservation manager.

Proper qualifications for such a man are described by R. S. Perry, president of Federal Telephone & Radio Co., Clifton, N. J., a division of International Telephone & Telegraph Corp: "First, he not only doesn't believe anything he is told, but he has that quality of irritating persistency to bore in further and prove he has real grounds for not believing you.

"The second qualification is a thorough knowledge of your factory, your products and the materials you use. Third, and most important, he must be fearless to a point of almost ridiculous neglect of the organization's sacred policies or channels of authority."

Materials—A. J. MacDonald, the conservation manager at Goodyear Aircraft, breaks his attack on waste into three phases: Prevention, utilization, reclamation, with the big emphasis on prevention. At Goodyear, 47.5 per cent of the operating dollar goes for material, which explains why its conservation program centers there.

This is a good place to start in any company because savings in

TOOLING

Are tools in the crib considered in specifying hole size, shape, other details of new products?

Are hole sizes, shapes, spacing, made uniform on all products so the same tools can serve every model?

HANDLING

If packages were hexagonal or octagonal instead of round or square, could more units be fitted on a standard pallet?

Are brackets and lugs built into products and packages to make them easier to grab and lift?

Can projecting handles, legs, etc., be disassembled to make a product easier to pack, take up less space?

FINISHING

Are prefinished materials—such as preplated wire, embossed sheets, ready-mixed paints—used wherever possible?

Are grooves, decorations, plated trim and similar features held to a minimum?

Are grooves and cutouts rounded off and

CUT WASTE . . . materials and utilities are easy to see. Opportunities can be found in better housekeeping, reasons scrap is created, disposal of scrap and substitution of materials.

A step up the scale come simplification of effort, trimming of paper work and red tape, the use of highly trained people in positions in keeping with their skills. Finally, there's the difficult area that involves design of product, including sensible specifications and design for easy maintenance.

Where To Start — Conservation is really nothing more than old fashioned thrift with modern trappings. Grandfather knew what it was all about when he said: "Waste not, want not." The check list with this article gives a few ideas of where it can be put to work today.

CONSERVATION CHECK LIST . . .

opened out so they'll be easier to polish, paint or plate?

Are materials that don't need finishing—colored plastics and the like—used where possible?

Does design make provisions for racking parts which are to be plated or painted and for allowing liquid to drain out of them?

Have things like fast-drying finishes and low temperature porcelain enamels been investigated to see if a change in type of finish can cut costs and speed production?

MAINTENANCE

Are vital parts made easy to reach by placing them at the top or near the front of the unit or near access doors?

Have you considered transparent doors or panels that permit a quick check without going inside?

Is the product designed for disassembly with common tools?

Are effects of wear and impact minimized by reinforcing parts which receive the most wear, or by making them cheap enough so they can be replaced and discarded?

Does product design include instruction plates, spare parts and tool kits, so they can be part of the original production plan instead of an expensive afterthought?

Are color and finish chosen for appearance, plus ease of cleaning, ease of matching (both in production and repair), ease of handling?

PROCESSING

Are standard purchased parts and materials—bolts, nuts, screws, and chemicals—used wherever possible?

Are materials selected for ease and safety of processing?

Is every effort made to use materials which require lowest processing temperatures? Present the least safety hazard? Are not easily contaminated? Will not corrode processing equipment?

Are product designs continually checked for changes to eliminate or combine parts?

MATERIALS

Can you use less expensive materials? Lighter gage or less strong materials? Less pure materials? Lighter materials that can save on handling and shipping? Standard grades and gages? Fewer varieties? Disposable or expendable materials?

SUPPLY

Have you re-examined sources of supply for chances to obtain materials in more convenient quantities? Obtain better prices, better delivery? Get help in design and processing? Help vendors slice their costs and improve quality?

SCRAP

Can you use waste material in making another part or product?

Can you replace materials that do not provide re-usable scrap with those which do?

Can you turn waste material into usable by-products?

MANPOWER

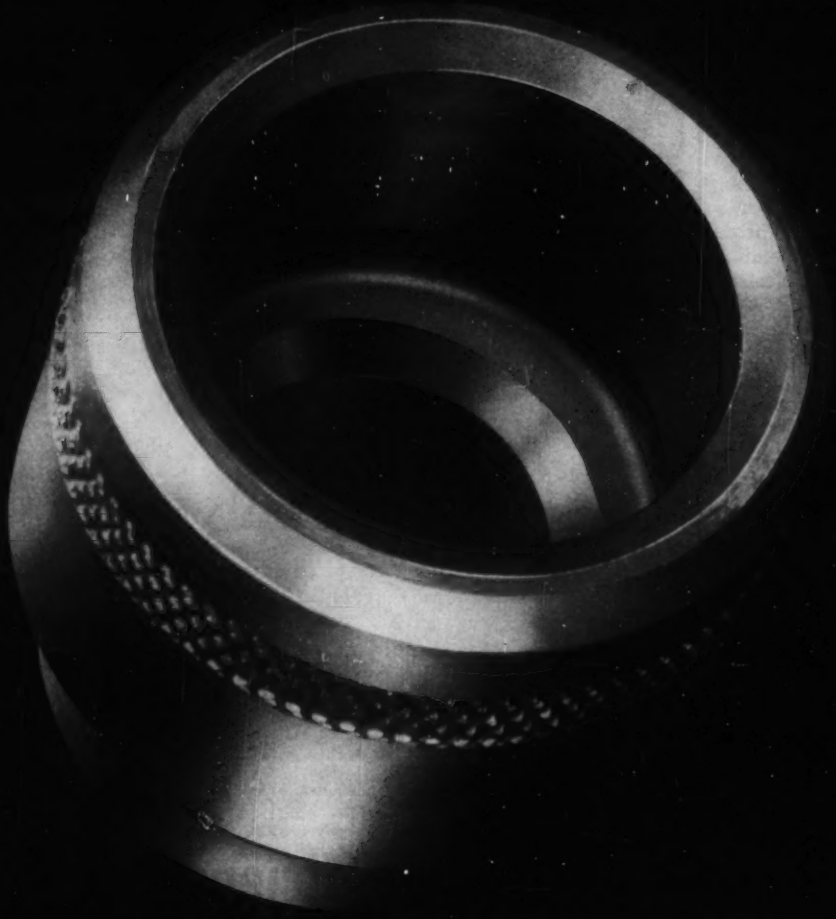
Is valuable productive time lost when workers wait for parts and materials, or for machines to complete their cycle?

Can jobs be done by less skilled labor?

Do inspectors waste time on 100 per cent inspection?

Do material handlers waste time moving and removing parts?

Pick exactly the right steel for any job from J & L's complete cold finished line



increased drill life 20% with J & L "1213" steel

This manufacturer of wrench socket blanks averaged 400 parts per hour when he changed to J & L "1213" steel. Form tool life increased from 10 to 20 hours. Drill life was 20% longer. J & L "1200" steels provide higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

MACHINING PERFECTION always starts with the right steel

(Advertisement)

TIPS ON TRUCKS

Increased truck efficiency, cleanliness point to "electrics"

From the standpoint of efficiency, for instance, it's important to remember that electric power is smoother; electrics are easier to inch and maneuver; electrics cost less to own, run, maintain.

And where extra-clean operation is mandatory—say, in food handling—there's little question. With electric trucks, you're never bothered by fumes, odors, or contaminating gases. By the same token, electrics won't drip oil.

The right "power package" can give performance-plus

Considering efficiency, cleanliness, safety, power costs, low downtime and maintenance costs—just to name a few advantages—the electric truck is your best bet.

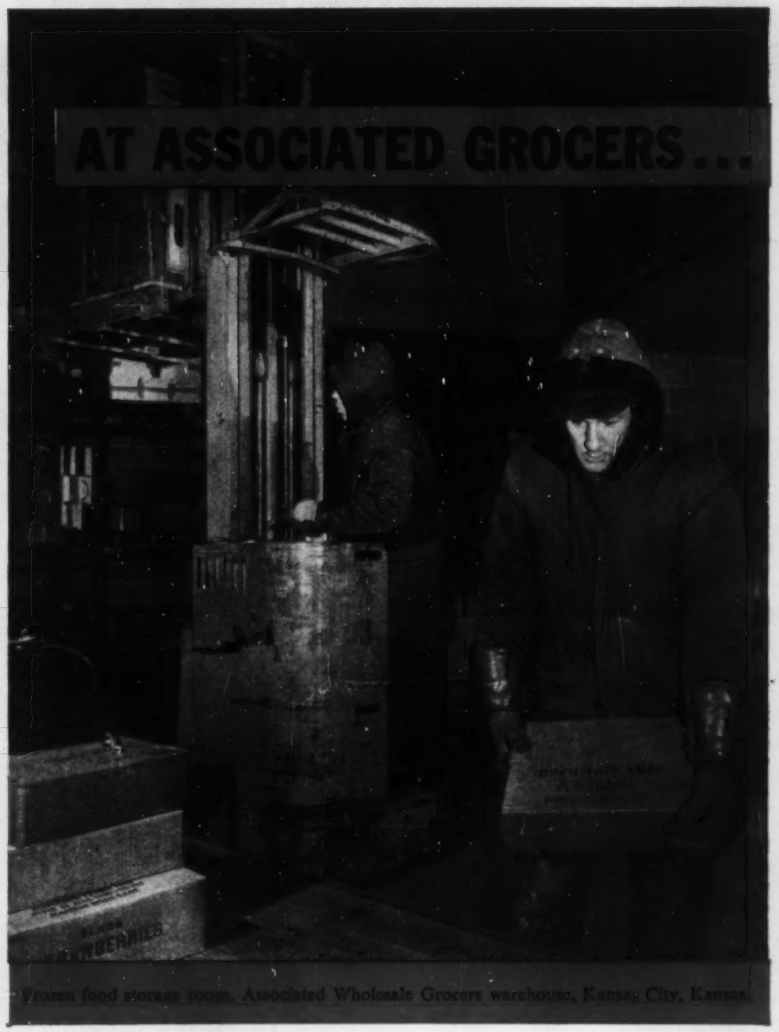
And you can get even more out of your electric truck when you equip it with a modern, advanced-design power package like the C & D *extra-capacity Slyver-Clad®* battery. In the standard-size tray, a C & D *Slyver-Clad* offers a minimum 10 percent greater capacity. In addition, C & D *Slyver-Clad* batteries are now equipped with the new Hi-Impac cell covers and containers. Truck downtime due to cell cover or container breakage is virtually eliminated. Plates are longer, heavier, designed so as to eliminate 'shedding' and prolong battery life.

(Trucks work longer . . . when they're powered by C & D Slyver-Clad batteries. For the detailed story, send for the literature offered in the advertisement at right.)

Paired for power . . .

Electric trucks . . .

and C & D *Slyver-Clad* batteries



Frozen food storage room, Associated Wholesale Grocers warehouse, Kansas City, Kansas

Warehouse efficiency doubled;

electric trucks with C & D batteries stack stores at 10° below . . .

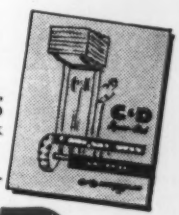
"Our electric fork-lift trucks and hand jacks— *powered by C & D batteries*— have increased the efficiency of the unloading and storing operation in our warehouse by 100 percent over hand methods . . . and are safer and easier to handle and cleaner to operate than gasoline-powered trucks."

This is the way Associated Wholesale Grocers sums up a top-efficiency materials handling operation since "going electric." Even working in sub-zero temperatures, advanced-design C & D *Slyver-Clad®* batteries provide the extra capacity needed to power these electric trucks throughout a full, hard-working shift.

More proof! C & D is a better battery buy!

See how advanced-design, extra-capacity C & D batteries give more work at less cost.

Write for Bulletin IT-524.



C&D BATTERIES, INC.

of Conshohocken, Pa.

SINCE 1906

Sales and service offices in principal cities from coast to coast

Controlled Atmosphere Furnace Heats Up to 2400°F

The Kleenmetal furnace can be used for annealing, hardening, nondecarburizing heating, silver or copper brazing and sintering metal powder parts.

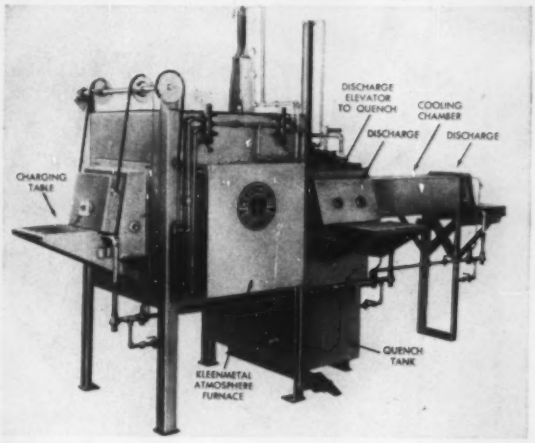
Gas or dissociated ammonia atmospheres can be used to assure a clean, scalefree surface on the work.

The furnace is furnished with globar electric heating elements but may be constructed for gas or oil heating.

A quenching system is built in the furnace between the discharge end and the cooling chamber.

For atmosphere cooling, the work is pushed through a water-jacketed chamber.

Furnace doors are equipped with pressurized flame curtains to protect the work. *Write*: W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn. *Phone*: Clearwater 9-1621



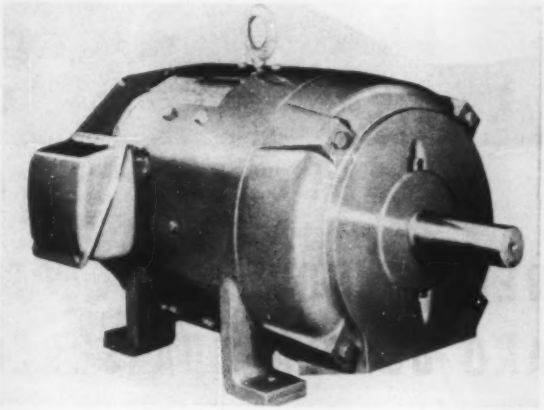
Motors and Generators Have Improved Cooling

The Life-Line H series of direct current motors and generators are equally effective as prime movers or as elements of automatic production systems.

The motors and generators have drip-proof enclosures and bear NEMA Class B ratings. Motor ratings are from 1 to 150 hp, and the generator ratings go from ¾ to 100 kw.

A high-temperature silicone insulating system is used in the machines. A controlled ventilation system draws air from the drive end, distributes the flow positively through the machine and expels the air at the commutator end.

The machines have low armature inertia and good commutating ability. One-minute current is rated at 200 per cent. *Write*: Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa. *Phone*: Express 1-2800



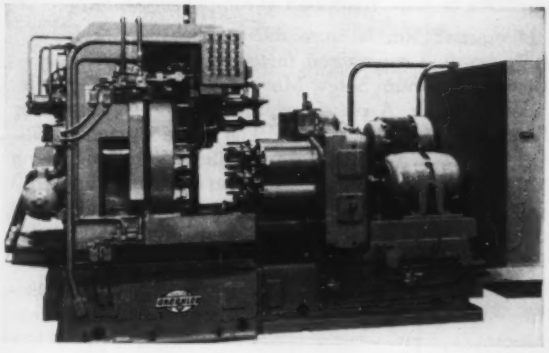
Indexing Machine Handles Five Sizes of Pipe Fittings

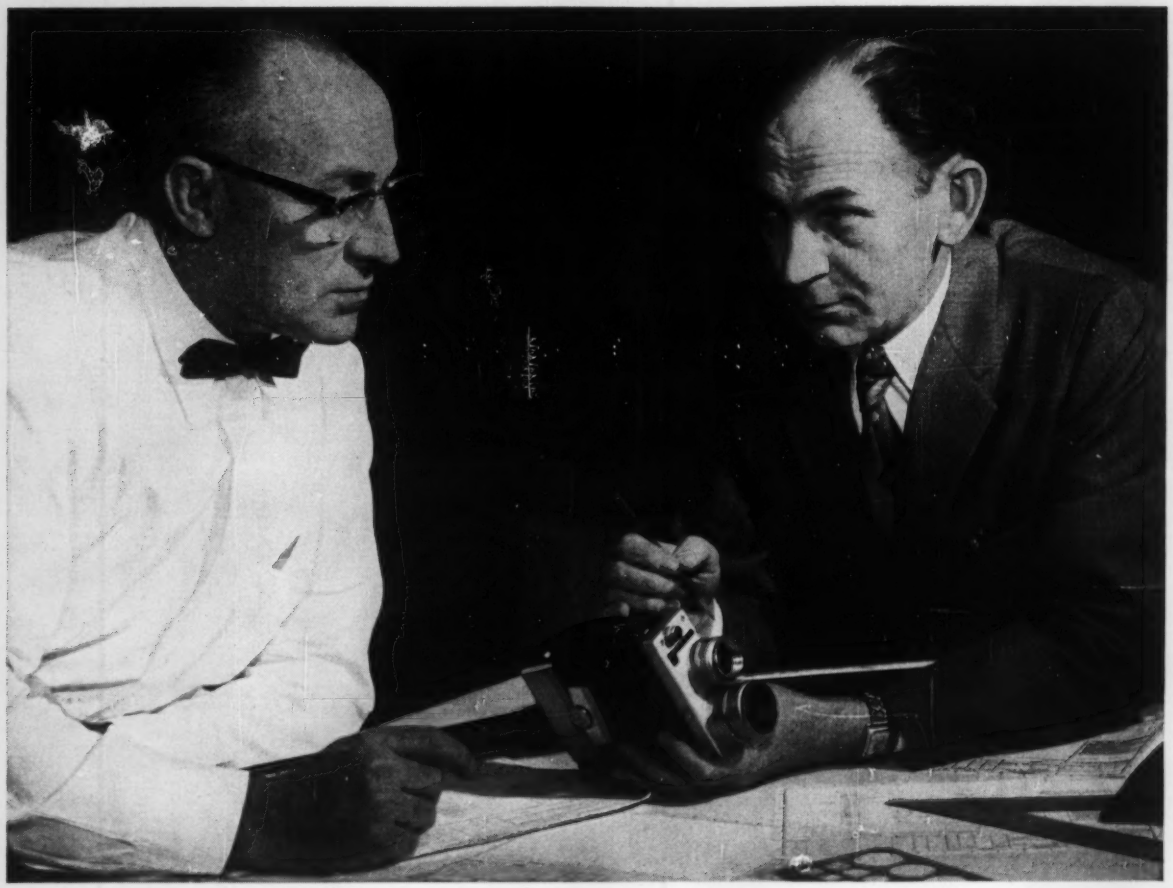
At the first station of this automatic single-way machine, a magazine loads pipe fittings, four at a time, into workholding fixtures.

Parts then automatically index. At the second station, parts are bored, chamfered and rough counterbored. Third: Finish counterbore and chamfering.

The fittings are tapped at the fourth station and unloaded automatically at the fifth station.

To accommodate the different sizes, the machine is equipped with interchangeable clamping fixtures, spindle speed changers and interchangeable leadscrew tap spindles for the different thread leads. *Write*: Greenlee Bros. & Co., Rockford, Ill. *Phone*: 3-4881





Essential teamwork between design and production departments calls Oscar Riese, left, Superintendent of Metal Parts Manufacturing, into conference with Chief Engineer Paul Richartz, right.

BELL & HOWELL KEEPS COSTS IN SHARP FOCUS AND USES ALCOA SCREW MACHINE STOCK

Competition is toughest at the top. Nobody knows that better than Bell & Howell, world's largest manufacturer of motion picture equipment. On one hand, there's insistence on precision and fine appearance; on the other, emphasis on cost reduction through faster production.

Dilemma? No, because every time Bell & Howell engineers find a new and faster production technique, Alcoa® Aluminum Screw Machine Stock lives up to its end of the job. A classic example is the lens nose for their Wilshire 8 mm camera. The cycle time for drilling, turning, threading, forming, fluting and engraving this part in one complete operation now takes only 1/50 of the period required originally. Even so, surface finish is held to 32 rms, with other tolerances as tight as .001″.

Bell & Howell took a long, hard look at every brass part during the shortages in 1951. They weighed aluminum's advantages—corrosion resistance, excellent machinability, light weight, ready availability and the low cost that comes with three times as many parts per pound. As a result, they're designing first for aluminum and using a whopping 300,000 pounds of Alcoa Screw Machine Stock annually.

To the values that prompted Bell & Howell's decision, add electrical and thermal conductivity. If these considerations prompt an analysis of your own requirements in screw machine stock, you'll find a man who can help at your local Alcoa sales office, listed under "Aluminum" in your phone book. Aluminum Company of America, 874-D Alcoa Building, Pittsburgh 19, Pennsylvania.

Bell & Howell Company

finer products through imagination

Lens mounts, control knobs, sprockets, film guide rollers and lens caps are among the typical parts machined by Bell & Howell from Alcoa Aluminum Screw Machine Stock.

Purchasing session brings together Chief Metallurgist Arthur Bartmann, left, and Ernest Van Cleave, right, screw machine stock buyer.

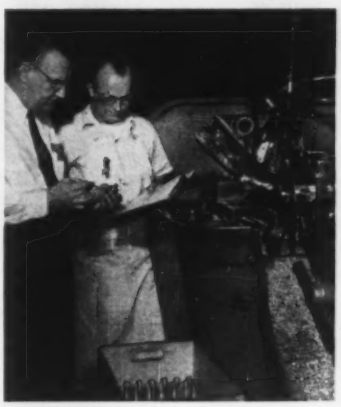
IN PURCHASING

"We started with Alcoa and we've always bought from Alcoa. The fact we've never had a reject on their screw machine stock shows that our confidence is well placed. Technical counsel is another advantage. Alcoa helped us assess the relative values of corrosion resistance and machinability to select the alloy best suited to our needs. In the area of deliveries, we've had wonderful cooperation through coordination of shipments with our production schedules. Finally, since heavy stock removal is characteristic of our operations, resale of scrap is an important factor in material cost."

IN ENGINEERING

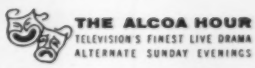
"Ours is a quality product, depending on a high caliber of precision and appearance for popular appeal. We value aluminum because it lets us design with assurance that the metal will measure up to our requirements and impose no problems in production. We have found that aluminum gives us the high finish and the perfect match from part to part that good appearance demands. We like the versatility that affords us a choice between plating and anodizing. Light weight, achieved with aluminum, is a significant sales point."

Checking the part (a telephoto lens mount) against the print are John Weber, left, general foreman, and George Sevick, right, operator.



IN PRODUCTION

"Concentricity, depth of flutes, diameter of the bore on this lens mount are typical examples of the close tolerances demanded; .001″ is common. Yet, when we find a way to cut production time on a part from more than four minutes down to 49 seconds, aluminum keeps pace with machining speeds. It doesn't punish the tools, so there's less down time for tool changes. And when we're handling 2″ bar stock, its light weight is mighty welcome."



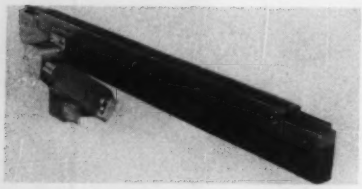
Your Guide to the Best in Aluminum Value

NEW PRODUCTS and equipment

Transfer Conveyor

Model 1000 mechanizes the removal and transfer of cylindrical workpieces (⅛ to 1 9/16-in. in diameter) between production machines or work stations.

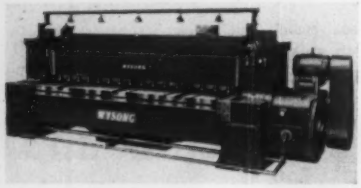
The transfer unit includes a chain belt conveyor, a drive motor, variable speed transmission and speed controls.



Speed can be regulated between 5 and 20 fpm. The feeding of parts can be adjusted to the speed of the production machine. *Write*: Production Feeder Corp., 3130 Johnnycake Ridge Rd., Mentor, O.

Power Squaring Shears

These shears can cut mild steel up to ⅜-in. thick. Three models cut lengths of 6, 8 and 10 ft.

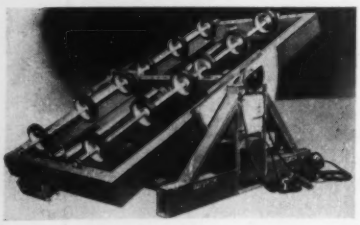


The back gage has a limit of 36 in., but it swings up to permit shearing of greater lengths. *Write*: Wysong & Miles Co., 625 Fulton St., Greensboro, N. C. *Phone*: 5-2864

Turning Roll Tilts

Fillet welding of flanged heads to tank bodies is speeded by these turning rolls.

Work up to 20 ft long and 4 in. to 6 ft in diameter can be turned. Capacities of the rolls: 5000 to 30,000 lb.



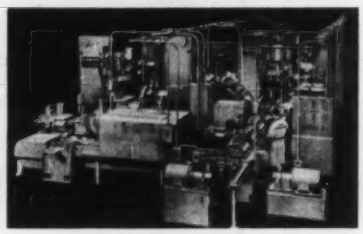
The degree of tilt is indicated by a protractor; the vessel or tank can be tilted 45 degrees either way from the horizontal.

Extreme rigidity is designed into the unit so that all welds can be made without flutter and waviness. *Write*: Aronson Machine Co., Arcade, N. Y.

Transfer Unit

This machine does 21 drilling, 6 reaming, 5 tapping, 6 boring and 2 precision facing operations on 490 pieces an hour at 100 per cent efficiency. The part is a servovalve body for automatic transmissions.

Parts travel through 25 stations —one loading, nine drilling, one



tapping, two rough boring, two precision boring, two precision facing, one washing, six visual inspection and one unloading.

Each of the palletized work holding fixtures carries three parts. An unloading unit removes parts from fixtures and places them on a conveyor. *Write*: Cross Co., 3250 Bellevue, Detroit, Mich. *Phone*: Walnut 1-3000

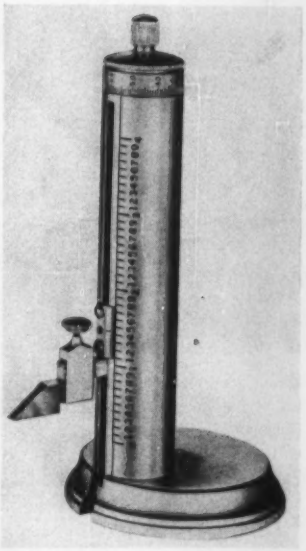
Gage Is Accurate

Micro-Height 4 is used for checking and measuring operations in machine shops, tool rooms and laboratories.

The gage has a 4-in. direct reading capacity with its scriber's straight edge in the down position. The capacity can be increased to 5 in. by reversing the scriber. Accuracy over the complete range is 0.0003 in.

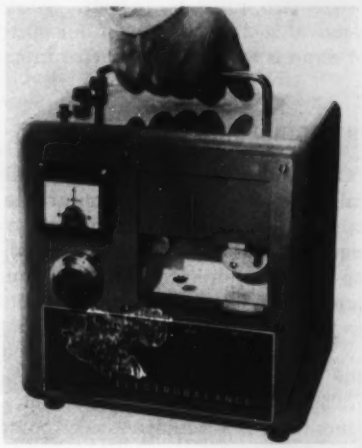
Readings of the unit's barrel are graduated in hundredths while vernier readings are made with the thimble at the top which is graduated in thousandths.

The scriber can be replaced with a dial indicator so that center distances or surfaces can be checked. *Write*: Greist Mfg. Co., 485 Blake St., New Haven 15, Conn. *Phone*: Fulton 7-2572



Balance Is Portable

The Electrobalance does microweighing operations in a few seconds. It eliminates worries about vibration, temperature, air currents and leveling.



The self-contained instrument weighs less than 12 lb. *Write*: Central Scientific Co., 1700 Irving Park Rd., Chicago, Ill. *Phone*: Wellington 5-8600

Surface Plate Calibrator

Planekator simplifies the calibration of plane surfaces. In effect, the instrument locates a theoretically perfect plane over the surface plate. Then indicator read-

It's only part of the National Castings story...

a multiple source within one company

Castings in—
malleable
HTM Metal
(pearlitic malleable)
carbon steel
alloy steel
*manganese steel**
*gray iron**

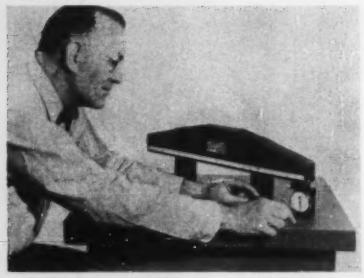
**Only from*
Capitol Foundry Division
Phoenix, Arizona

• Most companies—probably yours—pursue a "multiple source" policy to keep production lines humming. And with National you can continue this policy with several "plus" advantages.

• Individual jobs can be made interchangeable between plants . . . or equipment can be interchanged between plants. This way you get all the advantages of dealing with *one* strong company . . . with unparalleled facilities of *many* plants. Remember it's just part of the National story—flexibility of production with individual attention. AA-4887

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 • Cleveland 6, Ohio



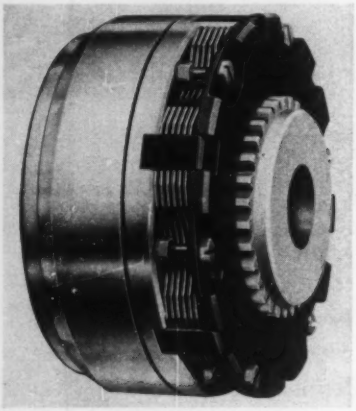
ings are taken between the perfect plane and the surface plate.

No calculations are needed. The instrument makes it possible to calibrate a surface to 10 millionths of an inch. *Write*: Rahn Granite Surface Plate Co., 641 N. Western Ave., Dayton 7, O. *Phone*: Melrose 1951

Magnetic Clutch

This self-contained clutch dissipates heat rapidly. It does not produce an axial thrust on other machine parts.

Axial and radial dimensions are comparatively small. The mechanical assembly is isolated from the integral mechanical parts.



Sizes: 2 to 13 in. for wet or dry operation. *Write*: Fawick Airflex Division, Fawick Corp., 9919 Clinton Rd., Cleveland 11, O. *Phone*: Atlantic 1-2211

Pintle Type Chain

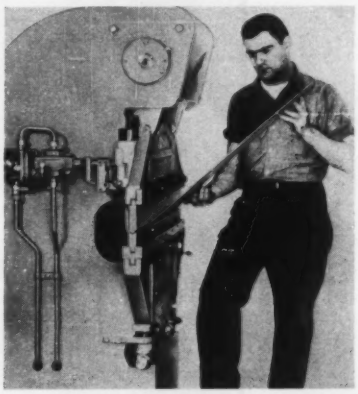
This chain is used in drives for woven wire conveyor belts which move heavy loads or assure positive motion.

Links of the chain have a heavy shoulder that provides equal bearing surfaces at both the open and closed ends. Distribution of bearing surfaces is equalized.

Large diameter, free - floating connecting pins are used in the links. *Write*: Cambridge Wire Cloth Co., Cambridge, Md. *Phone*: Cambridge 1033

Press Eliminates Kinking

Let-up Control is an accessory for hydraulic Di-Acro press brakes that eliminates whipping and the resultant kinking of sheets during forming operations.



Long sheets can be handled safely and efficiently because the speed of the ram can be reduced up to 50 per cent just before the die contacts the material to be formed.

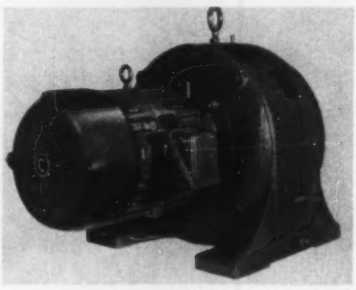
An adjustable flow control valve governs the ram's speed. *Write*: O'Neil-Irwin Mfg. Co., 619 Eighth Ave., Lake City, Minn. *Phone*: 6311

Gearmotors

This line of gearmotors comes with polyphase, single phase or direct current motors.

A variety of mountings are possible, including down shaft and tilted shaft positions.

Single, double and triple reductions provide output speeds from 750 to 7.5 rpm. *Write*: Century Electric Co., 1806 Pine St., St. Louis 3, Mo. *Phone*: Central 1-4920



Joins Carbide to Steel

Weldalloy A is an intermediate joining material that forms a cushion between carbide and steel. Its hardness can be varied from C20 to C50.

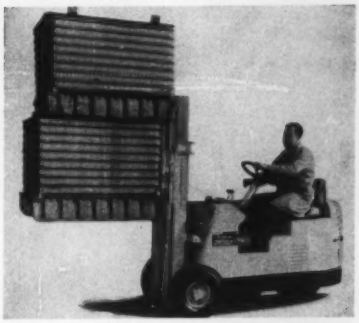
Air hardening steel can be heat treated after being joined with carbide.

Weldalloy B alloys are used as casing materials to reinforce carbide inserts. As molded, their hardness range is Rockwell B80 to B100. *Write*: Welded Carbide Tool Co. Inc., Clifton, N. J. *Phone*: Prescott 9-1678

Fork Truck Is Hydraulic

Power transmission is simplified in this line of gasoline or LP-gas operated trucks. The engine turns a hydraulic pump which actuates a hydraulic motor.

The truck will turn in its own length as the single rear wheel turns 90 degrees in either direction. Top speed is 11 mph.



The mast tilts 6 degrees forward and 10 degrees backward. *Write*: Pettibone Mulliken Corp., 141 W. Jackson, Chicago, Ill. *Phone*: Wabash 2-4580

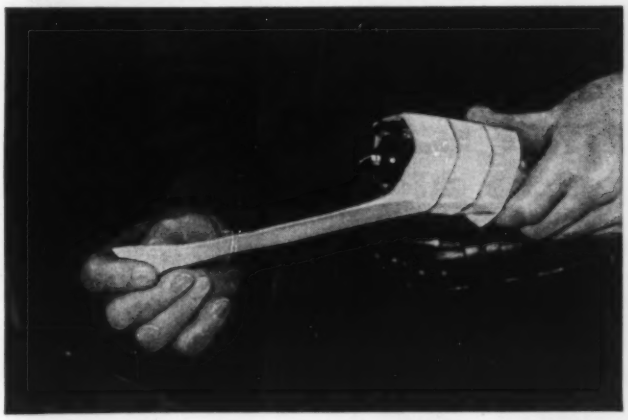
Storage System

Work stations, storage places and workbenches can be constructed from standard components of this module bench and storage system.

Component parts include stand and shelf units whose length is twice their width, three sizes of

Polyken Tapes give you
ALL WORK—NO WASTE

***Polyken* Tape solves packing problems.** This job of bundling aluminum strips requires only a narrow strip of *Polyken* Tape No. 113, one and a half times around the circumference of the bundle . . . at a considerable saving of time and tape.



***Polyken* Tape offers greater protection.** These cutting tools are guarded with a durable, abrasion-resisting sheath of *Polyken* Tape No. 113. Twice as much of a fragile tape wouldn't give stored tools equal protection. And this *Polyken* Tape pulls off clean.

THE RIGHT TAPE CAN SAVE MONEY WHILE SAFEGUARDING PRODUCT QUALITY

Here's how: When you select a utility tape from the *Polyken* line you get as much stretching power, tensile strength, tear resistance and moisture resistance as you need.

You don't pay for special qualities unless you need them.

Take *Polyken* No. 113 as an example. See how this tape offers all the advantages of cloth back adhesive tape in strength, ease of application and clean pull off yet is priced competitively with other methods of sealing, holding, bundling or protecting.

Plant surveys show this tape is being used for more than 245 specific applications—all at a savings! Is *Polyken* No. 113 at work for you?

Use this convenient coupon to find out how *Polyken* Tapes can mean "all work—no waste" on the job for you.

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Type 302, Sheet Base Price 50.00 cents per lb.
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Saving 10.75 cents per lb.
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Now you can SAVE $215 per ton in base price alone!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10¾ cents per pound difference in base price. Some of our customers are already saving more than $215 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

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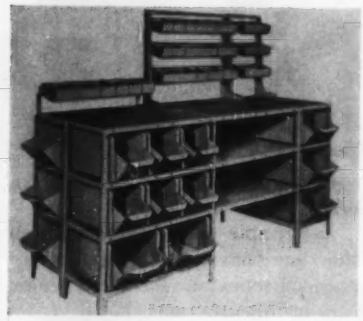
NEW PRODUCTS and equipment



hopper-front pans and several models of bench top bin storage units. *Write*: Bathey Mfg. Co., Plymouth, Mich. *Phone*: 1780

Milling Machine

This 4-spindle vertical machine mills out two recesses in beveled gear blanks about 3 in. in diameter. Other models can generate profiles on inside or outside diameters, and do keyway, face, climb and groove-type milling.

Infinitely variable feeds are available up to the capacity of cutters. A three-dimensional hydraulic tracer control can be added. *Write*: George Gorton Machine Co., Racine, Wis. *Phone*: Melrose 4-6644

Strapping Machine

Model 12 uses 14 to 18 gage round steel strapping. It can tie packages from 2 in. high, 8 in. wide to those 20 in. high, 26 in. wide.

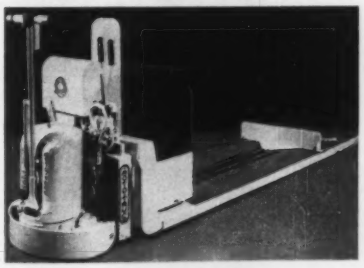
All operations are mechanically controlled and interlocked. Capacity is 24 ties a minute.

A spring adjustment determines tension. *Write*: Gerrard Steel Strapping Division, U.S. Steel Corp., 2915 W. 47th St., Chicago, Ill. *Phone*: Central 6-9200

Platform Truck

This walkie-type truck has a pusher bar which enables the truck to unload materials such as sheet steel.

Pallets or other load supporting devices are not needed; the load rides on the truck's platform.



The pusher bar has a travel of 85 in. and can push a load of 8000 lb. *Write*: Moto-Truc Co., 1959 E. 59th St., Cleveland 3, O. *Phone*: Utah 1-9595

Lathe Has Long Bed

Tubing, shafting and other long work can be machined on this lathe. It takes up to 129 in. between centers.

The swing over the cross slide is 9⅝-in., and maximum capacity over the bed ways is 16¼-in. diam.

There are 16 spindle speeds from 15 to 980 rpm. A quick change box provides 48 feeds.

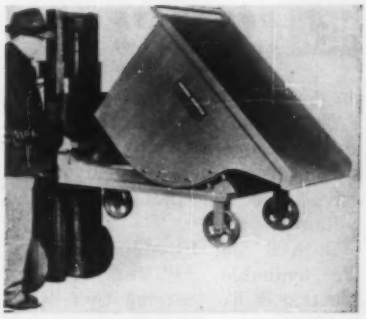
Maximum collet capacity is 1-in. The spindle hole takes work up to 1⅜-in. *Write*: South Bend Lathe Works, South Bend 22, Ind. *Phone*: Central 2-3311

Hopper Dumps Itself

Bulk materials, scrap and waste can be moved through narrow aisles and confined areas with this hopper. It has a capacity of 10 cu ft and is only 30 in. wide.

The hopper can be pushed by hand (it's mounted on three casters) or transported by fork truck.

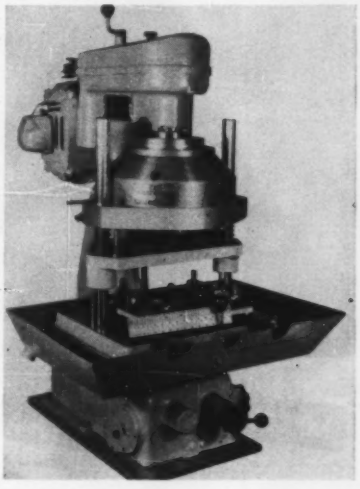
Self-dumping action is triggered when the operator releases a locking handle on the rear of the hopper. It rolls forward to dump its contents, then returns to an upright position and locks itself in place automatically. *Write*: Roura Iron Works Inc., 1401 Woodland Ave., Detroit, Mich. *Phone*: Townsend 8-3560



Drill Head Is Gearless

Tables for small drillpresses are moved upward to the drills carried by this drill head.

The indexing fixture makes it possible to drill 50 holes in two passes with the 25 spindles. *Write*: Zagar Inc., 24000 Lakeland Blvd., Cleveland 23, O. *Phone*: Redwood 1-0500



Mill Regulator

The VSMR is a dual circuit, variable speed electronic regulator for continuous process mills.

It operates on two sets of output thyratron tubes connected in parallel.

Each set of tubes can handle the output load without exceeding the tube rating. In normal operation,

the tubes tend to share the load.

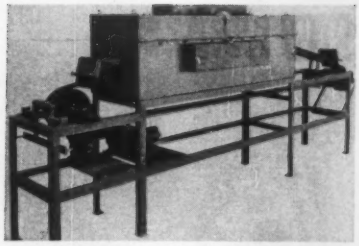
The power output section of the unit will operate into the motor field or the generator field of any drive to control speed, tension and voltage.

Both 6 and 10 ampere models are available. *Write*: Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, O. *Phone*: Redwood 2-7000

Conveyor Furnace

This heat treating furnace has a mesh belt conveyor which runs through an alloy muffle. The muffle is horizontal through the furnace chamber and sloped down on either end. This traps both the protective atmosphere and the heat.

Curtain burners on both ends of the muffle help to prevent the entrance of contaminating gases. Zoned heating provides required



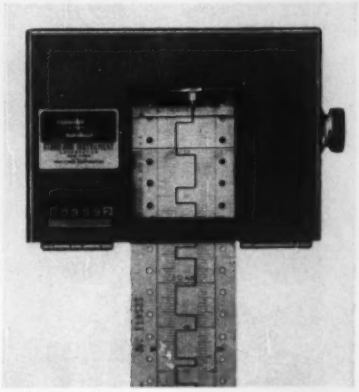
temperatures in the furnace chamber.

A variable speed drive controls the time that work is in the furnace. Preheat and cooling chambers prevent thermal shock. *Write*: Hevi-Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

Recorder

Model SR registers accumulated "on" or productive time.

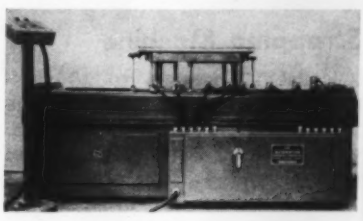
The strip chart is driven by a sprocket which maintains accurate timing. The stylus makes a clearly defined line and eliminates the cleaning and refilling of ink lines.



Notations can be made on the chart. *Write*: Standard Instrument Corp., 657 Broadway, New York 12, N. Y. *Phone*: Algonquin 4-5380

Transfer Machine

Parts are removed, transferred and loaded from one work station of a punch press to another by this



THOMAS FLEXIBLE COUPLINGS

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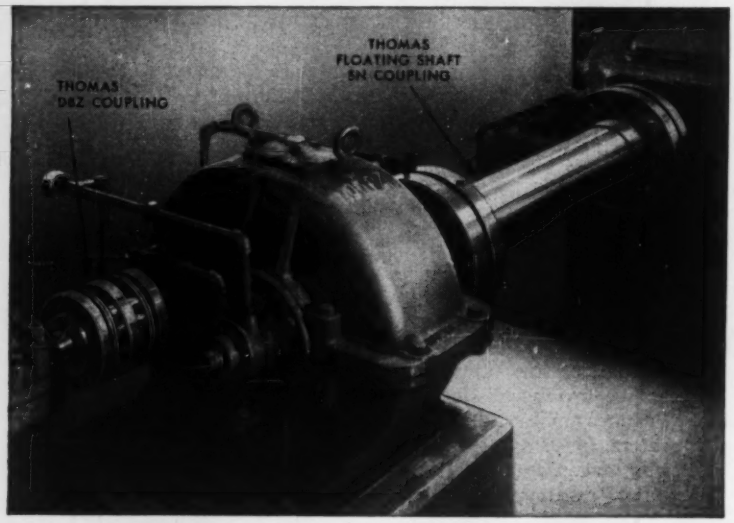

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Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

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1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

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THOMAS

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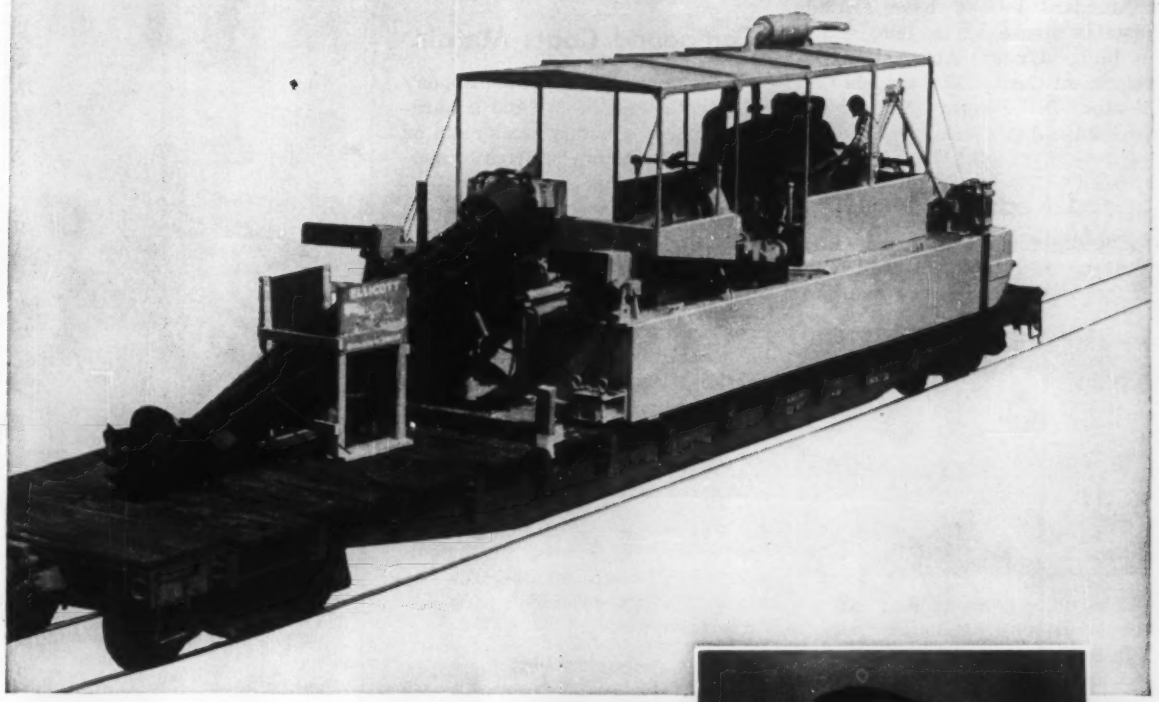
An Ellicott "Dragon" Dredge, constructed in part with Standard Steel Works forgings, ready for rail and freighter shipment to Hong Kong..



"To maintain our position of world leadership we must have superior service from our suppliers"

As suppliers of countless forgings to the Ellicott Machine Corporation for 30 years, we at Standard Steel Works feel we have been an integral part of the growth of Ellicott and in helping this world's largest dredge manufacturing company maintain its top position through all those years. We appreciate the fact that Mr. Mund and his associates realize it is not only by meeting design and steel analysis requirements for Ellicott, but also by consistently combining our know-how in steel fabrication with personalized attention to each order, that we have maintained our mutually satisfactory relationship. Every order we receive we accept as a service opportunity.

It is routine at Standard Steel Works to analyze all orders carefully and to present its requirements and possible problems on a personal, conference basis to the appropriate men in the shop; then to keep the customer continually advised on the progress of his order through our shops by means of frequent, periodic job-status reports. Our customers, whether they manufacture equipment for local use or for shipment to the far corners of the world, know that they can count on Standard Steel Works to deliver the right forgings at the right time—to help them maintain delivery schedules. Write or call Dept. 2D today and give us the opportunity to show you how our personalized service can prove invaluable in your operations.

"We are justly proud of our position as the world's largest designers and manufacturers of hydraulic dredges. Standard Steel Works is one of our suppliers which—in giving us that extra plus, superior service, while meeting our requirements for various forgings—have helped us maintain our world-wide leadership," *says Allan Mund, Vice President and General Manager, Ellicott Machine Corp., Baltimore, Md.*

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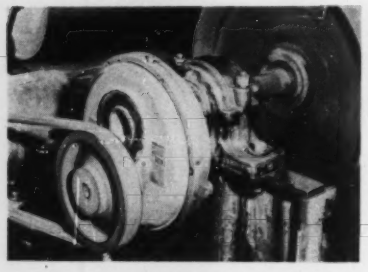
machine. Tooling can include turnover devices.

Standard models have an adjustable stroke 42 in. long and 8 in. high. *Write*: Automation Development Corp., 135 Reynolds Rd., Mentor, O. *Phone*: Willoughby 2-8300

Speed Reducers

Speeds of 60 to 350 rpm (with fixed or adjustable speed drives) are provided by these 5:1 reducers.



The units come in four sizes—for shafts with diameters up to 2, 2 3/16, 2 7/16 and 2 15/16-in.

Loads up to 25 hp can be handled. The units have adjustable torque arms. *Write*: American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa. *Phone*: Radcliff 5-4400

Contour Projector

Model 14-6 Kodak has a micrometer device for horizontal measurements and ample table travel to simplify staging. The movable work table has both horizontal and vertical traverse.

The projector can make magnified micrometric measurements for toolroom optical gaging. *Write*: Optical Gaging Products Inc., Rochester 11, N. Y. *Phone*: Genesee 8-8974

Compound Coats Metals

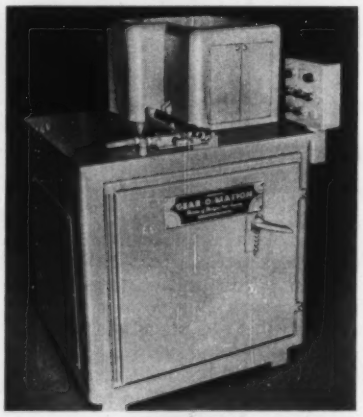
A compound of a resilient epoxy resin (Epocast 19-B) and a hardener makes a high viscosity dip or brush coating that adheres to metals and plastics.

No solvents are present in the light blue compound. Pot life is about one week. Curing takes place at 200 to 250°F.

The material is used in the dip coating of electrical parts and as a connector potting compound. *Write*: Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif. *Phone*: Chapman 5-5763

Gear Loader

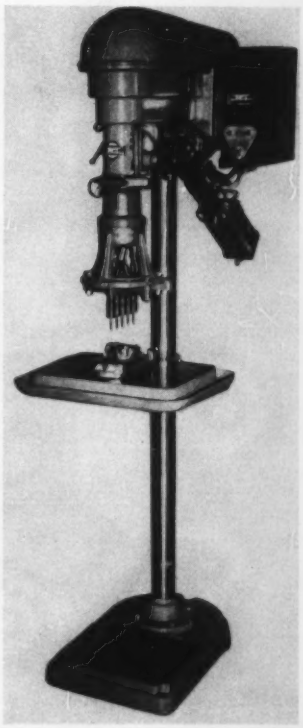
This device is for automatic skew loading prior to heat treating. In 1 hour, an operator can load 4200 face-oriented gears onto a gear carrier.



The air-operated machine can be applied to other center-bored parts and production methods. *Write*: Gear-O-Mation Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

It Taps and Drills

Single or multiple spindle operations are done by this machine. It is controlled by a switch to alternate between tap and drill positions for either right or left-hand operation. The spindle feed is controlled by air. The machine will do thread chasing operations. Cycling is automatic or semiautomatic.

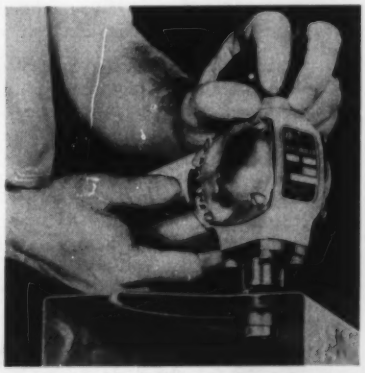


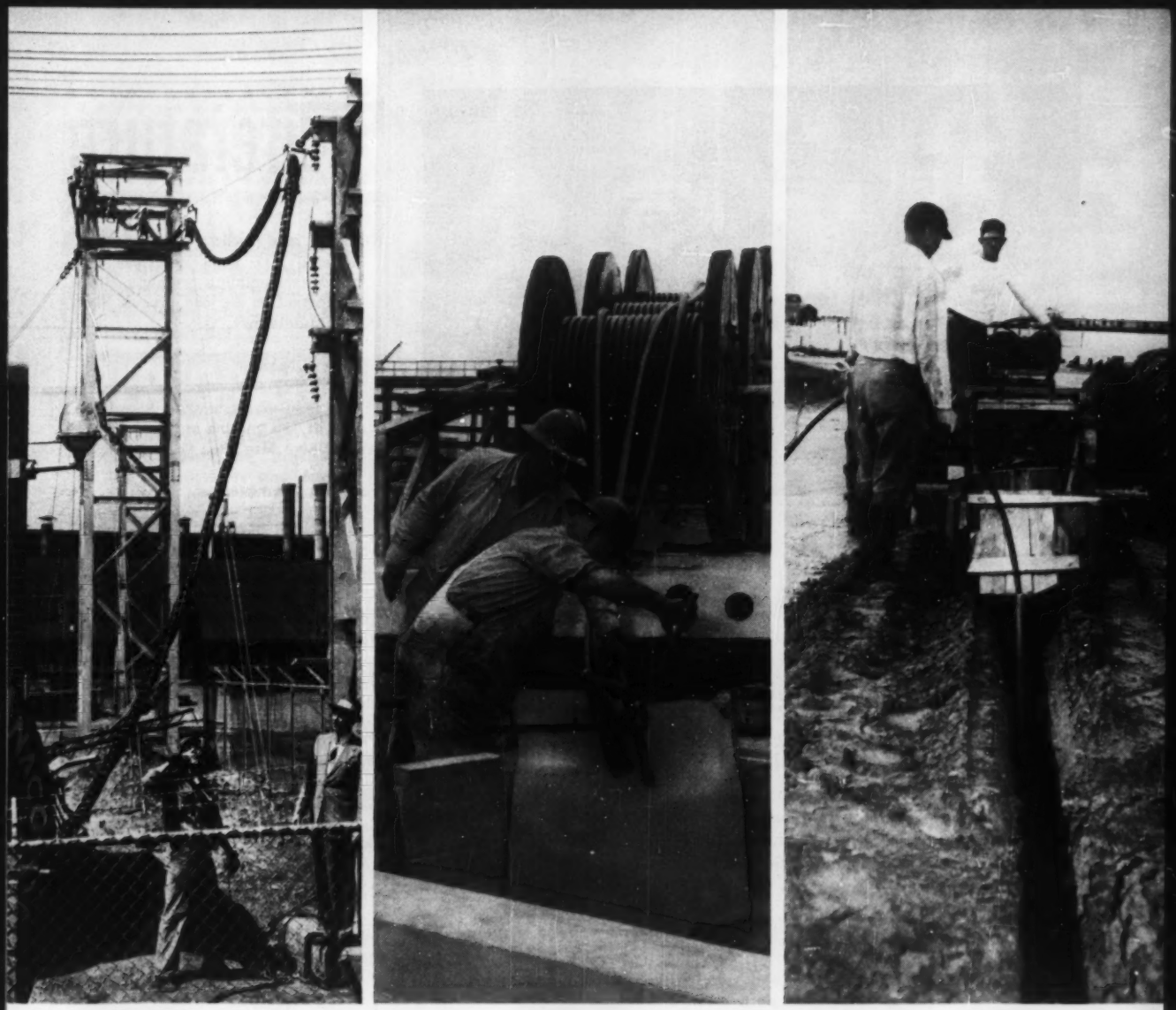
Speed range: 80 to over 8000 rpm. *Write*: Renco-Toledo Inc., 3358 W. Alexis Rd., Toledo 13, O. *Phone*: Jordan 7540

Shear Cuts Sheet Metal

The No. 16 Shear will cut through cold-rolled steel at speeds up to 30 fpm.

A one-piece shoe is contoured to indicate the correct cutting angle. It is constructed to permit cutting to a small radius. A deflector plate prevents thin metals from curling. *Write*: Black & Decker Mfg. Co., Towson 4, Md. *Phone*: Valley 3-4400





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See the Man from Anaconda or your Anaconda distributor for full information. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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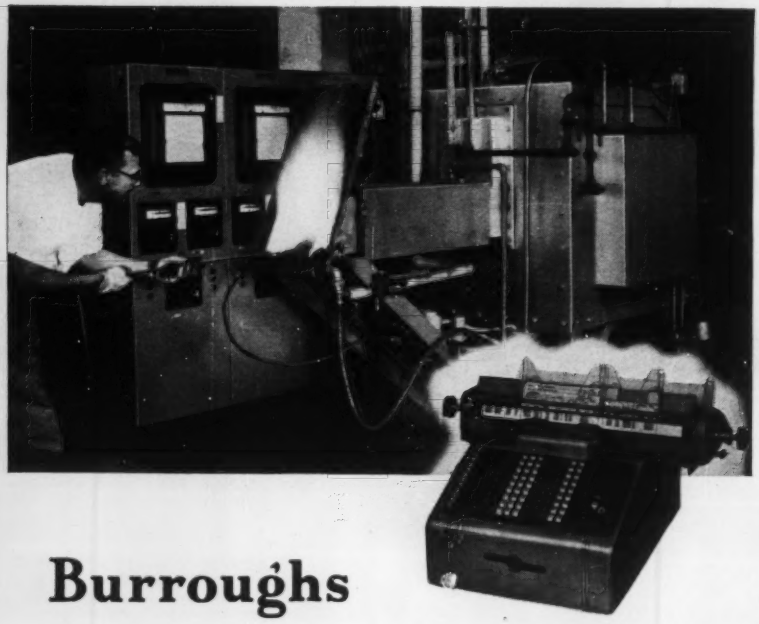

Burroughs

reports

"No Scaling, No Oxidation, No Distortion," in this HEVI-DUTY High Temperature Furnace

The Plymouth Division of the Burroughs Corporation uses a Hevi-Duty High Temperature Furnace to harden all high speed steel tools and dies used for machining the Sensimatic accounting machine. They consider the following features of this furnace outstanding.

1. Two zones of control allow them to maintain uniform temperatures up to 2300° F.
2. Air tight construction and curtain burners keep endothermic atmosphere pure, and parts clean and bright.
3. Water-jacketed cooling chamber allows them to bring temperature of parts down to 150° F. before removal from furnace, eliminating scale.
4. Simple construction of furnace permits charging while at operating temperature.
5. Air operated doors enable operator to have both hands free when charging furnace.
6. Long element life saves maintenance costs, reduces down time.
7. Electric heating elements provide clean, safe heat.

To complete their tool room department, Burroughs uses; two Hevi-Duty Multi-Range Furnaces for hardening and annealing steels other than high speed; two Hevi-Duty Salt Pot Furnaces for drawing and tempering tool steel; a Hevi-Duty Box Air Draw Furnace for drawing all steels; and a Hevi-Duty Pot Furnace for local hardening.

WRITE TODAY for Bulletins 153 and 653 to find the Hevi-Duty Furnace that will do the best job for you.

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NEW Literature

Write directly to the company for a copy

Roofing and Siding

Bulletin P.O. 5656 describes aluminized steel building products. Product Information Service, Armco Steel Corp., Middletown, O.

Steam Cleaner

Bulletin 17-A-41, 4 pages, describes a line of cleaners with a steam capacity of 180 gallons an hour. Homestead Valve Mfg. Co., Coraopolis, Pa.

Forging Hammers

A 38-page bulletin covers the maintenance of steam drop hammers in forging shops. Erie Foundry Co., Erie, Pa.

Roller Skid

Dollies for moving loads of 1000 to 6000 lb are listed in a 2-page bulletin. Stokvis-Edera & Co. Inc., 18 Secatoag Ave., Port Washington, N. Y.

Hose and Fittings

Bulletin 182, 12 pages, lists replacement parts for low and high pressure hose and fittings. Aeroquip Corp., Jackson, Mich.

Zinc Diecastings

The variety of parts available in zinc diecastings and thermoplastic moldings is illustrated in a 9-page bulletin. Gries Reproducer Corp., 125 Beechwood Ave., New Rochelle, N. Y.

Dispersions

Uses and carriers of 44 colloidal and semicolloidal dispersions of graphite, molybdenum disulphide, mica, vermiculite, zinc oxide, acetylene black, copper and glass are covered in a 4-page bulletin. Acheson Colloids Co., Port Huron, Mich.

Crane Control

Direct current hoist, bridge and trolley control systems are described in bulletin GEA-6434, 8 pages. General Electric Co., Schenectady 5, N. Y.

Pump Chart

A 4-page bulletin, 343, includes a pump selection chart. Barnes Mfg. Co., Mansfield, O.

Heating Elements

The 12-page booklet, A-1472, gives information on handling, unpacking, storage, installation and replacement

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of silicon carbide heating elements. Globar Division, Carborundum Co., Hyde Park Blvd., Niagara Falls, N. Y.

Electronic Relays

Open and hermetically sealed units are described in bulletin 1050, 8 pages. Alternating and direct current general purpose relays are covered in bulletin 1060, 8 pages. RBM Division, Essex Wire Corp., Logansport, Ind.

End Mill Speeds

A chart lists recommended surface speeds for most metals and translates these figures into revolutions per minute for end mills with diameters from 1/16 to 2½-in. DoAll Co., Des Plaines, Ill.

Hard Facing

Advantages of hard facing overlays in preventing wear and corrosion are covered in a 4-page bulletin. Cleveland Hard Facing Inc., 3047 Stillson Ave., Cleveland 5, O.

Optical Height Gage

A 6-page bulletin describes a gage which measures heights up to 61 in. with accuracies of ±0.000005-in. per inch of height. Webber Gage Co., 12912 Triskett Rd., Cleveland 11, O.

Corrosion Protection

Use of zinc under water as a galvanic anode to protect iron and steel is described in a 16-page bulletin. A 40-page bulletin describes zinc's uses for cathodic protection underground. American Zinc Institute Inc., 60 E. 42nd St., New York 17, N. Y.

Metal Cleaner

Oils are removed from steel and brass by the cleaner described in bulletin 47, 3 pages. A liquid acid metal stripper is covered in bulletin 46, 2 pages. MacDermid Inc., Waterbury, Conn.

Tracing Templates

Standard templates to save layout time on over 200 components for jigs and fixtures are depicted in this 8-page bulletin. Northwestern Tool & Engineering Co., 131 Hollier Ave., Dayton 3, O.

Control Valves

Double-seated diaphragm valves for the control of liquids, gases and steam are described in bulletin S 810-11, 4 pages. Single-seated valves are covered in bulletin S 810

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for the Steel Industry

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

Grefco processing of OLIVE HILL brick entails:

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3. Efficient deairing during brick forming, also to promote density and proper physical structure.
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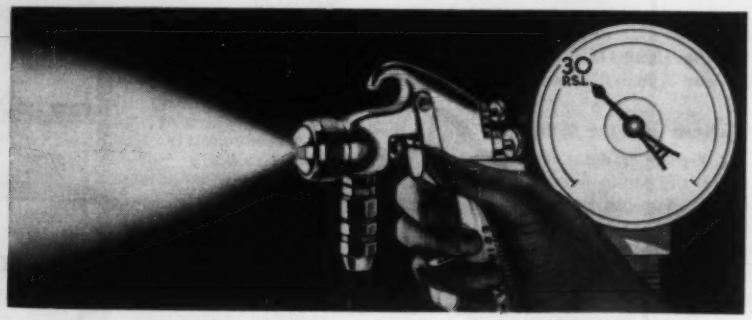
Saves Paint
Cuts Air Consumption

Paint sprayed cold with high atomizing air pressure often looks like this.



Paint sprayed hot atomizes with lower air pressure; reduces fog, saves material.

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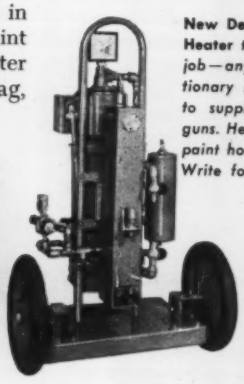
Why not call a DeVilbiss representative today and arrange for a demonstration? Or, send for Bulletin F-286. *The DeVilbiss Company, Toledo 1, Ohio.*



New DeVilbiss Portable Paint Heater *takes hot spray to the job—anywhere! Complete stationary systems also available to supply single or multiple guns. Heat-jacketed hose keeps paint hot right up to the gun. Write for Bulletin IE-114B.*

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NEW LITERATURE

11, 4 pages. Valve Division, Minneapolis-Honeywell Regulator Co., Philadelphia 23, Pa.

Air Moving

Activities and purposes of a 59-company trade association are described in this 12-page bulletin. Air Moving & Conditioning Association, 2159 Guardian Bldg., Detroit 26, Mich.

Purifiers

Bulletin 801, 8 pages, describes purifiers, mist extractors, scrubbers, steam traps and strainers. V. D. Anderson Co., 1935 W. 96th St., Cleveland 2, O.

Batteries

This 8-page bulletin describes a battery designed for the sustained power requirements of industrial electric trucks. Gould-National Batteries Inc., Trenton 7, N. J.

Taper Drive

Standard dimensions of shank and socket spline taper drives for counterbores and other metal cutting tools are listed in a 2-page bulletin. National Twist Drill & Tool Co., Rochester, Mich.

Plant Layout

A planning cube for three-dimensional layout of problems in the chemical and processing industries is described in this 4-page bulletin. Visual Plant Layouts Inc., Pennsylvania avenue at River, Oakmont, Allegheny county, Pa.

Mill Products

This 18-page reference guide is for preliminary discussion of design and fabrication with aluminum. Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

Welding Wire

Bulletin DH-402A, 4 pages, describes analysis and ways of packaging submerged arc and inert gas welding wire. Page Steel & Wire Division, American Chain & Cable Co. Inc., Monessen, Pa.

Extrusion Presses

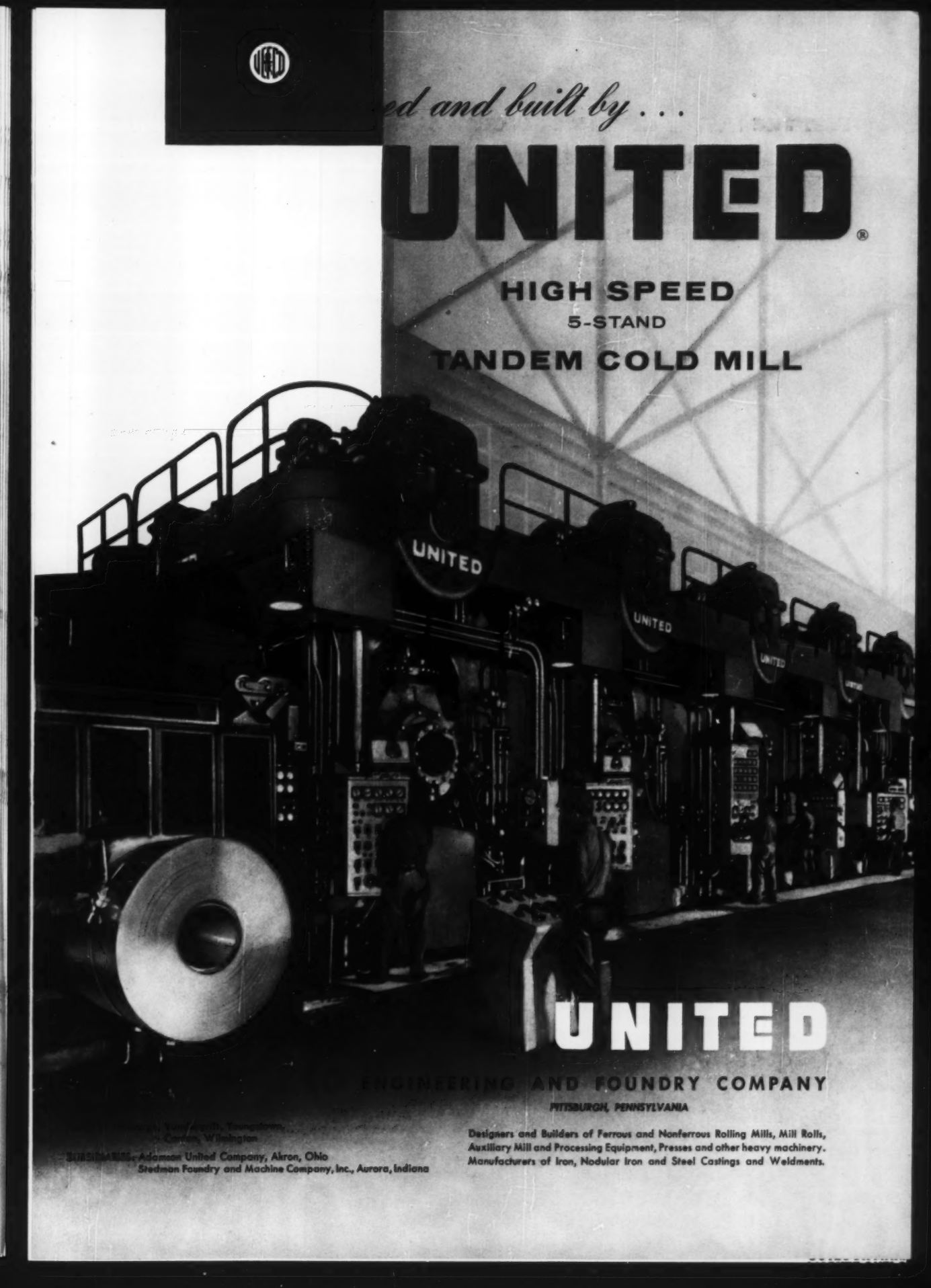
Bulletin 340-C, 6 pages, describes aluminum extrusion presses. Watson-Stillman Press Division, Farrel-Birmingham Co. Inc., Roselle, N. J.

Plating

This 12-page bulletin lists a line of plating materials and chemicals. Udylite Corp., Detroit 11, Mich.

Snagging Wheel

A resinoid wheel for foundry snagging is described in this 4-page bulletin. Peninsular Grinding Wheel Sales Corp., Box 801, Tiffin, O.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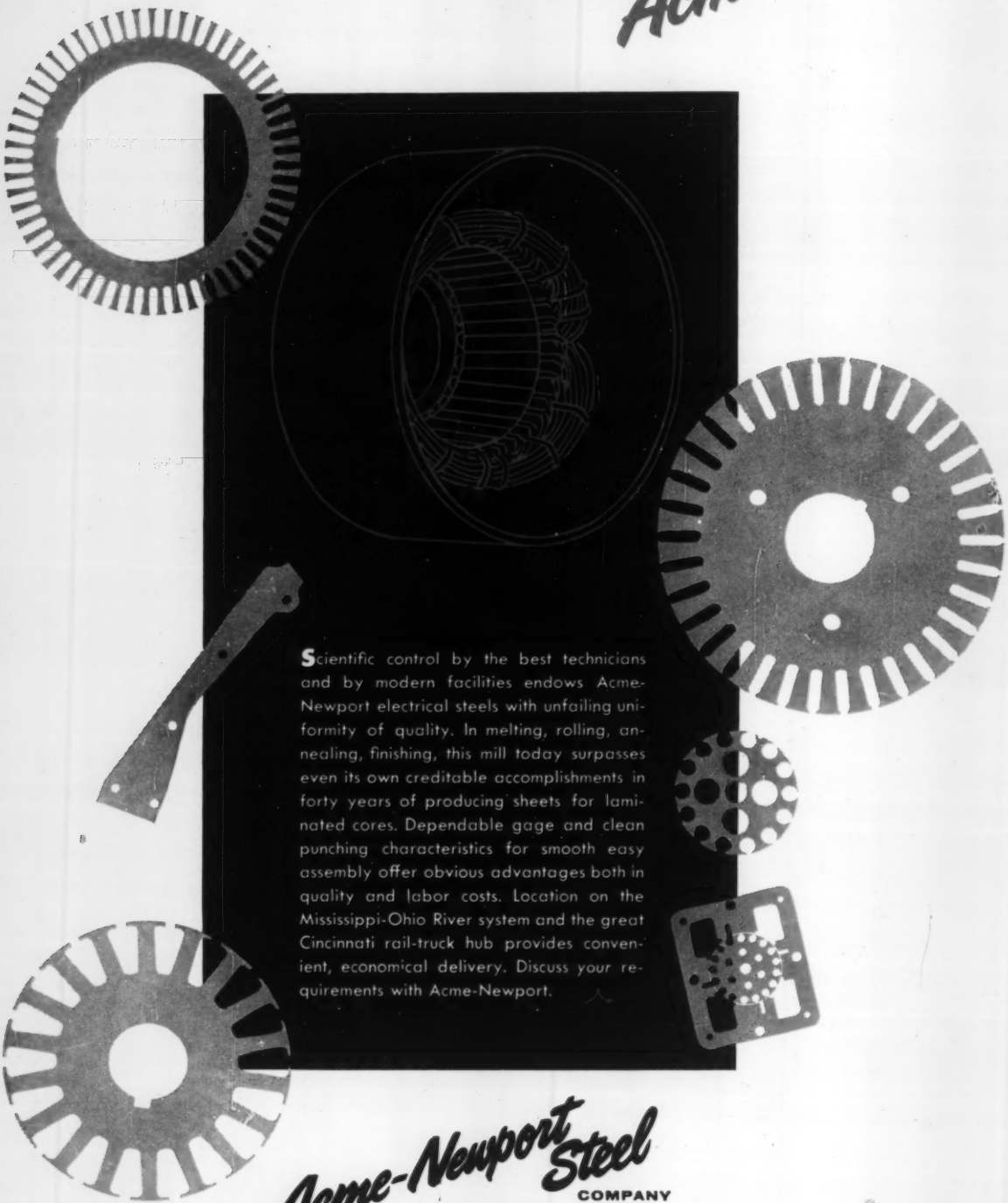
SUBSIDIARIES, Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

FOR THE HEART OF YOUR ELECTRICAL EQUIPMENT

SILICON STEELS OF UNVARYING QUALITY

Acme-Newport



Scientific control by the best technicians and by modern facilities endows Acme-Newport electrical steels with unfailing uniformity of quality. In melting, rolling, annealing, finishing, this mill today surpasses even its own creditable accomplishments in forty years of producing sheets for laminated cores. Dependable gage and clean punching characteristics for smooth easy assembly offer obvious advantages both in quality and labor costs. Location on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub provides convenient, economical delivery. Discuss your requirements with Acme-Newport.

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

Market Outlook

STEEL BUYERS look for a strengthening in demand for seven forms of finished steel in the third quarter. They're the products now in freest supply.

In contrast, buyers expect an easing in the demand-supply situation of the forms of steel now in strongest demand.

AUTHORITY—Those expectations are revealed in a report from the steel committee of the National Association of Purchasing Agents.

Products in which the buyers expect a strengthening in demand are: Hot-rolled bars and light shapes, at the warehouse level; cold finished bars, at the mills; drawn wire, at warehouse and mill levels; hot-rolled sheets, at warehouses; cold-rolled sheets and hot-rolled strip, at warehouses and mills; and cold-rolled strip, at warehouses.

Products in which buyers foresee an easing at the mills and warehouses are: Heavy plates, structural shapes, tubular goods (including line pipe and oil country goods) and stainless steel. They foresee an easing in tin plate at mills.

SURPRISE—The improvement in demand for third quarter delivery is counter to what many forecasters have predicted. The third quarter encompasses the summer vacation period and hot weather (which reduces production). Most analysts had expected the upturn would not come until the fourth quarter.

TIMING—If an upturn in demand comes in the third quarter, it likely will be near the end of the period—in September. By that time, the needs for 1958 model automobiles should begin to be felt. Consumers who have been living off their inventories should be finding it necessary to come back into the steel market for at least enough tonnage to supply their consumption needs then. Many consumers are said to have their inventories down to a dangerously low level.

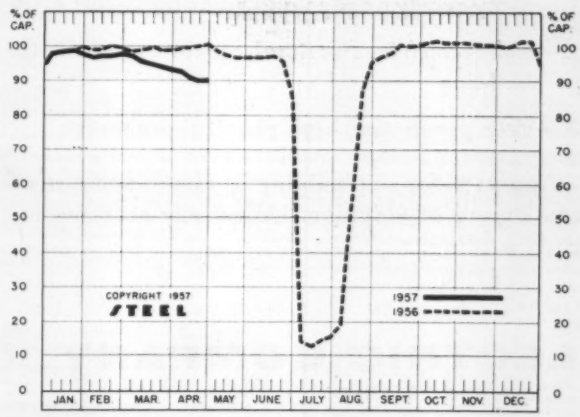
QUICK DELIVERY—Sheet producers are soliciting orders for third quarter delivery, but they are making it clear they still have tonnage available for the current quarter.

The easy demand for merchant bars is aiding sellers of reinforcing bars. The bar mills can concentrate on reinforcing bars. This makes it possible for sellers to bid on and accept more construction projects than they could when mills were busy on merchant forms.

STEADY PRODUCTION—Despite the lack of frantic demand for steel, producers have enough business to keep their ingot making facilities at a high level. In the week ended Apr. 28, the nation's mills produced steel for ingots and castings at an average of 90 per cent of capacity. This rate (the lowest of the year) prevailed in the preceding week. April will average between 90 and 91 per cent of capacity. The first quarter averaged 96 per cent.

STEADY PRICES—Steel prices are steady at the higher levels to which they have ascended over the last four months. In the East, numerous consumers—notably fastener makers—find that competition prevents them from fully passing on the increased prices they have to pay for rods and wire. STEEL's price composite on steelmaking scrap dropped 17 cents in the week ended Apr. 24 to $42.50 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

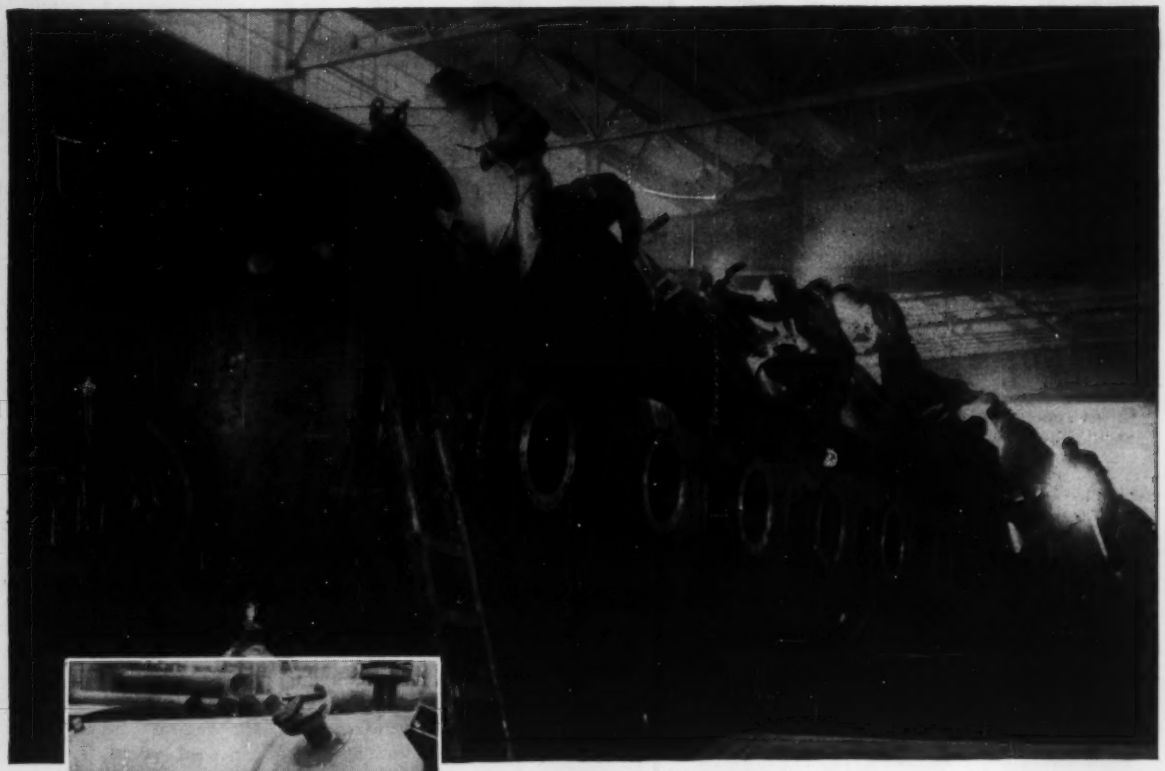
	Week Ended Apr. 28	Change	Same Week 1956	Same Week 1955
Pittsburgh	92.5	— 1.5*	106	98
Chicago	87.5	— 2.5*	100	101
Mid-Atlantic	96	+ 1	99	96.5
Youngstown	90	0	97	96
Wheeling	94	+ 9	96.5	95.5
Cleveland	89.5	— 1*	95.5	98
Buffalo	92.5	0	105	104.5
Birmingham	95.5	0	95.5	93.5
New England	58	0	87	90
Cincinnati	65	+ 2.5	99	92.5
St. Louis	94	— 5.5	96.5	98
Detroit	96.5	— 2	97.5	92
Western	103	+ 2	107	92
National Rate	90	0	100.5	96

INGOT PRODUCTION‡

	Week Ended Apr. 28	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	143.8†	144.0	147.2	153.9
NET TONS (In thousands)	2,310†	2,313	2,364	2,473

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 115 Technical Outlook—p. 163



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Where dependability counts

9 out of 10 high-strength jobs rely on Fleetweld 5

Favorite E-6010 Electrode for welding mild steel in all positions

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2.—*high strength* **for structural, machinery and shipbuilding**

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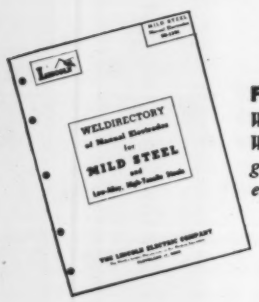
Approved for shipbuilding by Lloyds and American Bureau of Shipping. Universally accepted for code welding.



FABRICATORS!
Write for Mild Steel Weldirectory SB-1351 giving physical properties and procedures.

THE LINCOLN ELECTRIC COMPANY

Dept. 1628, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Auto Situation Slows Stainless Sales

SHIPMENTS OF STAINLESS STEEL PRODUCTS BY MARKET CLASSIFICATION—1956

END USE OF MARKET CLASSIFICATIONS	MILL Net Tons	MILL Per Cent	WAREHOUSE Net Tons	WAREHOUSE Per Cent	TOTAL Net Tons	TOTAL Per Cent
Consumer Products						
1. Automotive	101,487	22.0	4,546	2.0	106,033	15.4
2. Appliances	14,972	3.3	3,670	1.6	18,642	2.7
3. Utensils, etc.	15,722	3.4	867	0.4	16,589	2.4
4. Flatware, etc.	13,719	3.0	434	0.2	14,153	2.1
5. House furniture	2,052	0.4	802	0.3	2,854	0.4
6. Other consumer	3,342	0.7	5,578	2.5	8,920	1.3
TOTAL	151,294	32.8	15,897	7.0	167,191	24.3
Commercial and Professional Equipment						
7. Surgical & dental	1,370	0.3	2,767	1.2	4,137	0.6
8. Other Scien. & Prof.	1,620	0.4	4,574	2.0	6,194	0.9
9. Rest. & Commercial	7,474	1.6	15,974	7.1	23,448	3.4
TOTAL	10,464	2.3	23,315	10.3	33,779	4.9
Construction and Building Maintenance						
10. Plumb., Heat, Air Cond.	7,302	1.6	4,054	1.8	11,356	1.6
11. Builders Hardware, Arch. & Ornamental	7,997	1.7	7,354	3.2	15,351	2.2
12. Sheet Metal Shop	0	0	10,116	4.4	10,116	1.5
13. All other	6,772	1.5	8,096	3.6	14,868	2.2
TOTAL	22,071	4.8	29,620	13.0	51,691	7.5
Industrial Machinery & Equipment (Incl. Maint.)						
14. Chemical industry	4,241	0.9	9,879	4.4	14,120	2.1
15. Oil and Gas	4,375	1.0	4,366	1.9	8,741	1.3
16. Pulp & Paper	1,086	0.2	7,892	3.5	8,978	1.3
17. Textile Processing	987	0.2	6,654	2.9	7,641	1.1
18. Dairy	7,664	1.7	6,768	3.0	14,432	2.1
19. Other Food & Bev.	3,648	0.8	10,050	4.4	13,698	2.0
20. Electrical	19,728	4.3	6,636	2.9	26,364	3.8
21. Metalworking	10,296	2.2	10,619	4.7	20,915	3.0
22. Farm	1,213	0.3	966	0.4	2,179	0.3
23. Railroads	3,710	0.8	1,202	0.5	4,912	0.7
24. Shipbuilding	2,290	0.5	4,717	2.1	7,007	1.0
25. Fasteners	8,809	1.9	15,081	6.6	23,890	3.5
26. Containers & Closures	2,904	0.6	1,899	0.8	4,803	0.7
27. Steel Forges, Converters & Redrawers	83,296	18.1	15,142	6.7	98,438	14.3
28. Aircraft	33,990	7.4	21,093	9.3	55,083	8.0
29. Ordnance	3,867	0.8	5,051	2.2	8,918	1.3
30. All other	26,080	5.7	29,401	12.9	55,481	8.1
TOTAL	218,184	47.4	157,416	69.2	375,600	54.6
31. Export	22,054	4.8	1,065	0.5	23,119	3.4
Unreported mill Shipments	36,319	7.9	.....	...	36,319	5.3
GRAND TOTAL	460,386	100.0	227,313	100.0	687,699	100.0

THE DEMAND for stainless has fallen off as much as 20 per cent from the April, 1956, level.

April, usually one of the best months, has been slow, and it doesn't look like there is going to be much of a rush in May and June to beat possible price increases. Stainless is too expensive to tie up in inventory.

Delivery times have been shortened dramatically within the last few weeks. An Armco Steel Corp. sales manager says the average has dropped from about 70 days (last April) to about 30. Another producer says hand mill sheets are down to four weeks, compared with 10 to 12 a year ago; continuous mill sheets down from 14-16 weeks to four or five. "If we were to receive an order for Type 430 strip today, we could ship within a week," he declares.

Autos Again — The fact that cold-rolled sheets and strip are the easiest to get points to the chief reason for the loose market: Auto makers aren't buying as heavily as anticipated. The importance of this market can be seen from the table on this page. Most producers believe that stainless is holding its own in pounds per car, but automotive orders are down in almost direct relation to the reduction in the output of cars. J. C. Richards, general sales manager for Washington Steel Corp., Washington, Pa., feels that if the auto industry ends up selling about as many cars this year as it did last year, stainless sales will be about the same as they were in 1956.

Most other markets have held up. One producer reports that even the appliance market is doing well. Another indicates some decline in this category but expects a pickup soon. There is no diminishing in the demand from industrial construction (such as pulp and paper mills and textile mills), but architectural uses are developing more slowly than desired—but the outlook is good. J. A. Seckeler, assistant manager of sales for Republic Steel Corp.'s Alloy Steel Division, says: "Between now and 1960 we're going to ex-

perience a tremendous growth in this field."

Scrap Better—The decline in demand for stainless has improved producers' inventories of nickel and has driven down the price of stainless scrap. One purchasing agent in Pittsburgh happily reports he is offering $325 a gross ton for 18-8 bundles and solids and getting all he needs. In January, the price was $480 to $520 a ton. Few producers are buying for inventory even at this price.

Most producers feel business will turn up significantly in the fourth quarter, and they believe they'll be able to handle it. They'll have a small inventory of nickel accumulated from the second and third quarters. Some even anticipate an increased supply.

Stainless Steel . . .

Stainless Steel Prices, Page 245

Strip and sheet sales are slowest in the stainless market. Other products (plates, bars, wire, tubular goods) are in firm demand. Auto builders' purchases of sheets reflect the sag in auto output. There is no reduction in the use of stainless per car built.

The decline in demand for sheets is stretching out available supplies of scarce nickel.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 242 & 243

Sheet mills are soliciting third quarter orders. They still have open tonnage for shipment this quarter. May and June specifications will better April volume, due partly to consumers' need for rounded inventories and the virtual certainty of higher prices this summer. Unless price-hedge buying develops in increased volume, second quarter bookings will not be markedly greater than those in first quarter.

Automotive buyers (and others) continue to work off inventories. Some shops are said to be operating on 20-day supplies, which is considered below the danger point in most cases. Not much heavier buying is anticipated from the auto builders over the next several weeks. Appliance makers' demands are quickening a little. Galvanized sheet demand is disappointing. Adverse weather is holding back considerable farm volume.

Tubular Goods . . .

Tubular Goods Prices, Page 245

Except for buttweld pipe and mechanical tubing, demand for tubular goods continues strong—especially large diameter pipe and oil country goods. Large pipe books are filled for the next couple years.

In some cases, buyers are being asked to place their third quarter needs early to permit mills to divert unwanted allotments to other users.

For all practical purposes, buttweld pipe is a "shelf" item and is available for prompt shipment. This reflects sluggishness in certain areas of construction. Specialty tubemakers booked heavy orders for April and May shipments, but June delivery tonnage is coming in slowly.

Some large users of mechanical tubing are setting May orders back a month, asking for June deliveries. This is resulting in some

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Bert, we're in trouble—too many rejects. They're up to one in seven. We'd better find out what's wrong—fast.
Yes, Tony, our Whitemarsh Lab tells me your rejects can be cut 'way down with a Pennsalt dry lubricant—and it'll pay for itself in no time.
OK—we'll make a trial run Tuesday.
THE NEXT MONTH

open spaces in mill schedules. Warehouses are cutting mechanical tubing orders for May and June.

Steel Bars . . .

Bar Prices, Page 241

Most barmakers have not opened books for third quarter business, but tonnage would be accepted for that position were it offered. Mills still have open capacity for the closing weeks of the current quarter, and, in some cases, can work in tonnage for May shipment. This applies to hot and cold-drawn carbon and alloys.

Chicago area sellers say the lag in automotive buying is the chief cause for easiness in the bar market—particularly in the smaller sizes, which are also used extensively in the farm implement industry. Hot-rolled bar sales at Pittsburgh are described as "spotty." In some areas, brisk demand is noted; in others, orders are lagging.

With many consumers' stocks held to less than one month's requirements, the mills are being asked to give service that is comparable to warehouse delivery.

Precision Drawn Steel Co., Camden, N. J., has booked a $670,677 contract for cold-finished bars from Frankford Arsenal. Armco Steel Corp., Middletown, O., booked an order for $243,655 worth of steel discs.

Plates . . .

Plate Prices, Page 241

Some platemakers have opened order books for third quarter tonnage. Heavy plate rollers are booked solidly for this quarter. Heavy plates are in slightly freer supply, and buyers are less inclined to pay premiums. Some broker tonnage is reported appearing at prices under mill levels.

In general, pressure for heavy plates continues. One midwestern sheetmaker is reported selling slabs as heavy plates. They were destined for rolling into light gage plates and heavy sheets.

Most of the continuous sheet mills are filling gaps in their rolling schedules occasioned by the slack demand for sheets by producing light gage plates.

Most users of heavy plates have good backlogs, notably electrical and power plant equipment. Their requirements will be substantial the rest of this year.

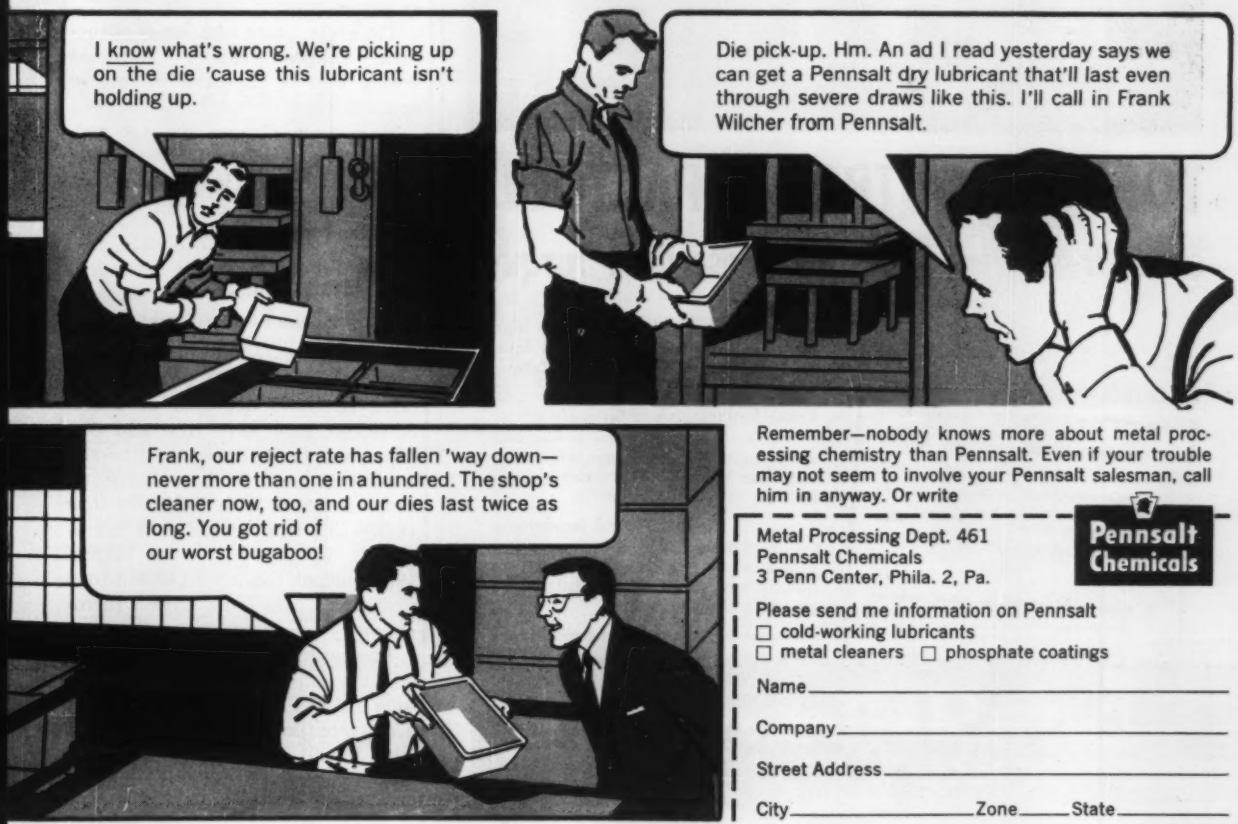
Wire . . .

Wire Prices, Pages 243 & 244

Seasonal gains in merchant wire demand are disappointing. Manufacturers wire volume also continues depressed. Reflecting the sluggish demand, wire mill operations are lagging, though the ending of a strike at the Wickwire Spencer mill in Buffalo will result in some production betterment at that point.

May schedules for most carbon grades and specialties are not filled. Buying in anticipation of midyear price increases is slow. Some consumers in the East, notably screw and fastener makers, have not been able to pass along fully the higher prices on rods and wire which were posted by mills in the first quarter.

Midwestern mills think demand for merchant wire from the farming areas is at least 30 days late


I know what's wrong. We're picking up on the die 'cause this lubricant isn't holding up.
Die pick-up. Hm. An ad I read yesterday says we can get a Pennsalt dry lubricant that'll last even through severe draws like this. I'll call in Frank Wilcher from Pennsalt.
Frank, our reject rate has fallen 'way down—never more than one in a hundred. The shop's cleaner now, too, and our dies last twice as long. You got rid of our worst bugaboo!

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Quality control has risen to a new high for this large manufacturer of farm equipment since I-R Torsion-Bar Torque Control Impactools were installed.

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Now, with Torque Control Impactools, the company consistently runs nuts to prescribed torques, saves time, improves quality and eliminates hand torque checking operations.

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Ingersoll-Rand

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8-524

in developing. Chief reasons: Heavy rains and cold weather have prevented farmers from doing usual spring maintenance work.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 241

Midwestern sellers of reinforcing bars are profiting from increased output. Reason: Demands on mills for merchant bars are less pressing. Sellers are able to bid on more construction projects than would be the case if steel bar supplies were tight.

Building is off a little at Chicago, but the easing of its requirements for reinforcing bars is more than offset by swelling demands from toll roads and highway construction.

Warehouse . . .

Warehouse Prices, Page 246

Continued slow sales of sheets, strip, bars and mechanical tubing have caused distributors to reduce their second quarter orders. No change in demand is expected before late May when a pickup may develop in anticipation of higher prices around midyear.

Tin plate, plate and heavy structural shapes demand continues strong and is expected to remain so until June.

Market conditions are not uniform. Some sellers in the Cleveland district, for instance, report substantial bookings; others note continued sluggishness.

Pig Iron . . .

Pig Iron Prices, Page 246

Blast furnace production (pig iron and ferroalloys) in March totaled 7,246,879 net tons, of which 7,179,100 tons were iron and 67,779 tons, ferroalloys, reports the American Iron & Steel Institute. This compares with 6,658,106 tons (6,596,133 iron and 61,973 ferroalloys) in February. In March, 1956, output totaled 7,149,443 tons (7,083,877 tons iron, 65,566 ferroalloys).

Production in the first quarter amounted to 21,185,755 net tons (20,983,177 pig iron, and 202,578 ferroalloys). This compares with 20,801,824 tons in the 1956 first quarter (20,609,021 tons of iron, and 192,803 tons of ferro-

alloys), reports the institute.

Demand for merchant pig iron is slow because of restricted buying by foundries serving the automotive industry. Some gray iron shops are running well. One New York foundry making castings for electric motors is stepping up operations gradually. Some iron inventories are being reduced.

With the settlement of the wildcat strike at the Wickwire Spencer mill at Tonawanda, N. Y., two blast furnaces are expected to resume production. Pig iron is starting to move out of Buffalo by lake vessel and canal barges. Early season shipments are not quite as large as those a year ago.

Wheeling Steel Corp. shut down its blast furnace at Benwood, W. Va. It will be idle about 60 days because of "decreased requirements for pig iron."

Metal Powders . . .

Price reductions averaging 20 per cent on prealloyed steel powders for powder metallurgy applications were effected last week by the Vanadium-Alloys Steel Co., Latrobe, Pa. They are attributed to improved manufacturing techniques.

Structural Shapes . . .

Structural Shape Prices, Page 241

Indications are wide flange beams will continue in tight supply for some time, but the outlook for standard structural shapes is for some easing in availability, especially by the third quarter. New England shops are getting more structurals, including wide-flange.

Building construction has not responded to seasonal influences as much as had been expected, and supplies of semifinished steel for the rolling of shapes are improved. The pressure for structurals, including wide flange beams, is not as great at Chicago as it has been.

The lag in building is resulting in lower prices on fabricated steel, on the average. Backlogs are smaller, although steel deliveries are extended in most cases. There is some concern that the lag in new business may continue for a while. But most fabricators expect good activity.

Heavier bridge inquiry includes

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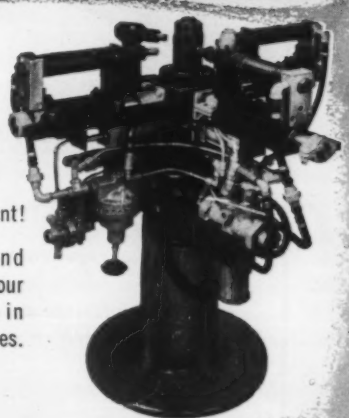

8-521

Ingersoll-Rand

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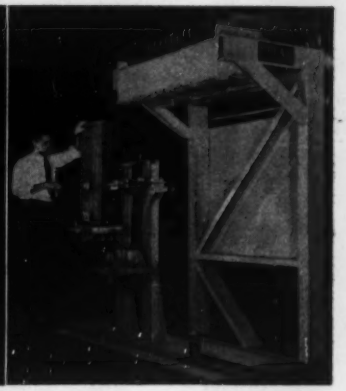
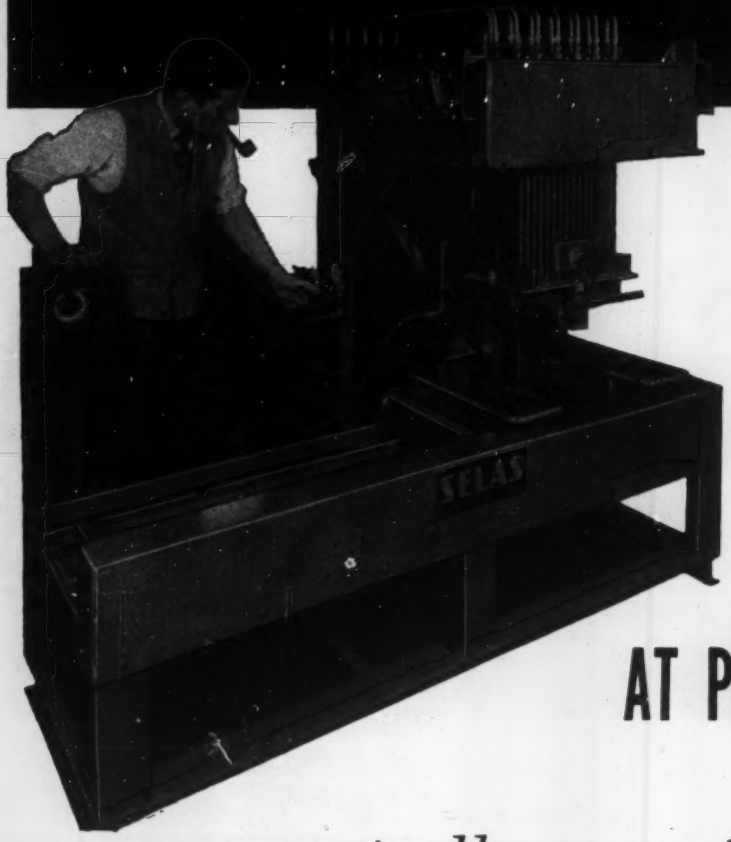
These Selas-designed, Selas-built brazing machines do essentially the same job . . . silver-brazing tube return-bends to the copper tubes of aluminum-finned coils. Both machines are manually-loaded and unloaded; both employ automatic cycling and Duradiant* air-gas burners. Each is quickly adjusted to accommodate a variety of workpiece sizes, brazing all the joints of each coil simultaneously. The small machine brazes coils from 13 to 22 in. high at the rate of 40 per hr. The larger machine, in which workpieces are mechanically conveyed, handles coils up to 5⅓ ft. high at the rate of 30 per hr.





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. . . automatically or semi-automatically

Selas precise temperature control and heat placement . . . targeting heat exactly where needed and only where needed . . . brazes coils at high production rates using low-cost gas and air. These specially-designed, custom-tailored machines form pressure-tight brazed joints without damage to the easily-melted aluminum fins. Yet heat input is sufficiently high to overcome, during brazing, the natural ability of heat exchangers to draw heat away from the joint area.

Whatever your brazing needs, Selas will design, engineer and build fully-automatic or semi-automatic equipment for you . . . after simulating your production conditions, using your workpieces, in our laboratory. You get speed, versatility, reproducible uniformity. High labor skills are not required because Selas builds the skills into your machine. And, since Selas designs, constructs, starts-up and services each machine, problems usually associated with divided responsibility are eliminated.

Send for Bulletin No. 25 "Production Brazing and Soldering" and reprints "Gas-Fired Machine Brazing" and "Mechanical Heating Puts Brazing on the Production Line."

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

6000 tons for a project in New England. A number of Pennsylvania bridges are up for bids, both structurals and reinforcing bars being involved. Delays in highway construction and cancellation of a job in southern California's Antelope Valley have sent area fabricators into a mad scramble for the remaining jobs.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2300 tons, steel towers, transmission line, Bonneville Power Administration, Interior Department, Portland, Oreg., to the Bethlehem Pacific Coast Steel Corp., San Francisco.

3500 tons, state bridge over the Schuylkill river, Pennsylvania boulevard, Philadelphia, through Buckley & Co., general contractor, to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

1300 tons, plant, Radio Corp. of America, Indianapolis, to the Indiana Bridge Co., Muncie, Ind.

960 tons, plant, Air Products Inc., Trexlertown, Pa., to the Easton Structural Steel Co., Easton, Pa.

750 tons, including plates, bulkhead and frame repairs to tanker *Mission Purisima*, to the Willamette Iron & Steel Co., Portland, Oreg., low at $834,000.

STRUCTURAL STEEL PENDING

3800 tons, state bridge over the Schuylkill river, University avenue, Philadelphia, bids May 10.

2700 tons, state bridge, Mifflin county, Pa.; bids May 10.

337 tons, state bridge, Westmoreland county, Philadelphia; bids May 10.

130 tons, state bridge, Washington county, Pa.; bids May 10.

121 tons, state bridge, Beaver county, Pa.; bids May 10.

3300 tons, viaduct, J. F. Fitzgerald expressway, Dover and Union Park street, Boston; bids May 7, state department of public works.

1275 tons, bridge structures, Southeast expressway, section 5, Braintree-Quincy, Mass.

900 tons, three state truss bridges, Woonsocket, R. I.; bids in; bolted connections.

500 tons, pier, Brooklyn, N. Y.; bids to the New York Port Authority.

500 tons or more, intakes and other facilities, Rocky Reach dam; California Steel Products Co., Richmond, Calif., low at $1,989,243 to Chelan county, P.U.D. No. 1, Wenatchee, Wash.

350 tons, control tower, Newark airport, New York Port Authority; bids direct.

180 tons, trashracks, beams, guides, etc., Hills Creek dam, Willamette river; bids to the U.S. Engineer, Portland, Oreg., May 23.

125 tons, substations, Barnhart-Plattsburgh transmission project, Plattsburgh and Kents Falls stations; bids, steel direct, May 7, New York State Power Authority.

125 tons, one 15 by 29.65 ft coaster gate, Grand Coulee dam, Columbia Basin project; bids to the Bureau of Reclamation, Denver.

715 tons, nine grade separations, Connecticut turnpike, Old Lyme-East Lyme-Waterford, to the Bethlehem Steel Co., Bethlehem, Pa.; L. G. DeFelice & Son Inc., North Haven, Conn., general contractor; 665 tons, mat reinforcement, to the American Steel & Wire Division, U.S. Steel Corp., New York; 600 tons, steel piles, to the Bethlehem Steel Co.; 1225 tons, fabricated structural steel, to the Phoenix Bridge Co., Phoenixville, Pa.

600 tons, bridge, Summit, Del., for the Corps of Engineers, Philadelphia, to the U.S. Steel Supply Division, U.S. Steel Corp., Pittsburgh; American Bridge Division, U.S. Steel, recently booked 5625 tons of structural steel for this project.

325 tons, state highway bridge, Lehigh county, Pa., through Latrobe Contracting Co. to the Welding Service Co., Canonsburg, Pa.

290 tons, plant addition, General Radio Corp., Cambridge, Mass., to the Truscon Steel Division, Republic Steel Corp., Boston; Edmund J. Rappoli Co., Cambridge, Mass., general contractor.

266 tons, municipal sewage project, contract 2770, Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.

200 tons, gymnasium and library, State Teachers' College, Worcester, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; John Capobianco Co., Boston, general contractor.

REINFORCING BARS PENDING

2439 tons, 2.074 miles of Tri-State route, 1.285 miles of North Illinois route, and 4.311 miles of interchange connectors, including erection of concrete bridges, contract N-8A, Leyden and Maine townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago, bids May 16.

2135 tons, bridges, Roosevelt boulevard extension, Philadelphia; also 7300 tons of structural steel, 28 plate girder spans.

875 tons, plant addition, Foxboro Co., Foxboro, Mass.

865 tons, Hills Creek dam, Willamette river; bids to the U.S. Engineer, Portland, Oreg., May 23.

855 tons, including 525 tons of mesh, highway and bridges, near Dillsburg, Pa.; also 1110 tons of structural steel, and 2168 linear ft of 20-ft steel beam piles.

400 tons, highway structures, Penn-Lincoln parkway, Pittsburgh.

325 tons, including 270 tons of mesh, highway project, Providence-North Providence-Lincoln, R.I.

125 tons, water channel, Eugene, Oreg.; bids to the U.S. Engineer, Portland, Oreg., May 10.

100 tons, bars and structurals, highway structures, Stroud, Monroe county, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1037 tons, state bridge, LR782, Montgomery county, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.; shapes to the Phoenix Bridge Co., Phoenixville, Pa.

2400 tons, building, Cherry Hill Enterprises, Camden county, N.J.; general contract to John McShane, Philadelphia.

857 tons, state bridge over the Schuylkill river, Pennsylvania boulevard, Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.; 3500 tons of structurals to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.; Buckley & Co., general contractor.

PLATES . . .

PLATES PENDING

620 tons, penstock, Hills Creek project, Willamette river; bids to the U.S. Engineer, Portland, Oreg., May 23.

125 tons, 250,000-gal ground storage steel tank, Whiteman AFB, Knob Noster, Mo.; bids May 3, district engineers, Kansas City, Mo.

CAST IRON PIPE PENDING

6000 tons, 44,000 ft of 16 and 12 in.; also 2-million-gal steel reservoir; bids to W. Fred Lee, secretary, Mukilteo, Wash., May 2.

183 tons, Tacoma system expansion; general contract to Paine & Galucci Inc., Seattle, low at $154,995.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Anglo-Lautaro Nitrate Corp., Chile, 11 changeable gage, diesel-electric, to General Electric Co., Erie, Pa.

RAILROAD CARS PLACED

Baltimore & Ohio 200 open-top, drop-bottom hoppers, to the Bethlehem Steel Co., Bethlehem, Pa.

Safety-Engineered for superior service...

U-W GOLD CLIPS

- Designed for rugged duty
- Wide range of sizes from ⅛" to 1¼"
- Conveniently packaged

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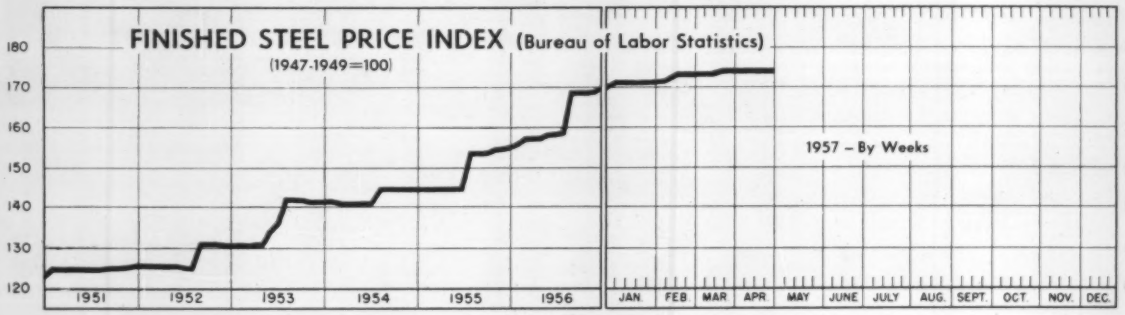
Price Indexes and Composites



Apr. 23, 1957	Week Ago	Month Ago	April Avg	Year Ago
174.0	174.0	174.0	174.0	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350
Rails, Light, 40 lb	6.817
Tie Plates	6.275
Axles, Railway	9.400
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates, Carbon	5.900
Structural shapes	5.667
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.150
Bars, H.R. Stainless, 303 (lb)	0.508
Bars, H.R., Carbon	6.075
Bars, Reinforcing	5.788
Bars, C.F., Carbon	9.910
Bars, C.F., Alloy	13.450
Bars, C.F., Stainless, 302 (lb)	0.533
Sheets, H.R., Carbon	5.945
Sheets, C.R., Carbon	6.789
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.660
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 430 (lb)	0.475
Strip, H.R., Carbon	6.000
Pipe, Black, Buttweld (100 ft)	18.894
Pipe, Galv., Buttweld (100 ft)	23.034
Pipe, Line (100 ft)	190.108
Casing, Oil Well, Carbon (100 ft)	185.566
Casing, Oil Well, Alloy (100 ft)	288.980
Tubes, Boiler (100 ft)	46.737
Tubing, Mechanical, Carbon (100 ft)	23.713
Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.433
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.133
Black Plate, Canmaking Quality (95 lb base box)	7.233
Wire, Drawn, Carbon	9.775
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale Ties (bundle)	7.400
Nails, Wire, 8d Common	9.365
Wire, Barbed (80-rod spool	8.412
Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	227.41	227.41	227.41	209.10	171.92
Index in cents per lb	6.161	6.161	6.161	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$139.71	$139.71	$139.71	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.70	60.27	52.54
Basic Pig Iron, GT	64.23	64.23	64.23	59.80	52.16
Malleable Pig Iron, GT	65.77	65.77	65.77	61.27	53.27
Steelmaking Scrap, GT	42.50	42.67	52.50	55.33	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R.,deld.,Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	Apr. 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry(Birm.)deld.Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$41.50	$41.50	$46.50	$55.50	$44.00
No. 1 Heavy Melt, E. Pa.	46.00	46.00	52.00	56.00	42.50
No. 1 Heavy Melt, Chicago	40.00	40.50	44.50	54.50	42.50
No. 1 Heavy Melt, Valley	41.50	41.50	44.50	59.50	44.00
No. 1 Heavy Melt, Cleve.	38.50	38.50	41.50	56.50	43.00
No. 1 Heavy Melt, Buffalo	41.50	41.50	48.50	55.50	43.00
Rails, Rerolling, Chicago	56.50	56.50	59.50	72.50	52.50
No. 1 Cast, Chicago	39.50	39.50	41.50	52.50	49.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.50

Steel Prices

Mill prices as reported to STEEL, Apr. 24, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 242; to footnotes, page 244.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $74.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ... $74.00
Bridgeport,Conn. N19 .. 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 .... 74.00
Fontana,Calif. K1 .... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 .. 74.00
LoneStar,Tex. L6 .... 80.00
Munhall,Pa. U5 ..... 74.00
S.Chicago,Ill. R2, U5 .. 74.00
S.Duquesne,Pa. U5 ... 74.00
Sterling, Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .... $91.50
Bridgeport,Conn. N19 .. 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 .. 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 .... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 .... 91.50
Lackawanna,N.Y. B2. 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 .... 91.50
S.SanFrancisco B3 ... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 .. $107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 ..... 107.00
Fontana,Calif. K1 .... 128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 .. 107.00
Johnstown,Pa. B2 .... 107.00
Lackawanna,N.Y. B2.107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 .... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa U5 .. 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland,O. R2 .... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 .111.50
S.Duquesne,Pa. U5 .. 111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 .... 5.025
Munhall,Pa. U5 ..... 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 .. 4.625

WIRE RODS

AlabamaCity,Ala. R2 .. 5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1.. 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 .... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B3 ..... 6.60
Minnequa,Colo. C10 .... 6.05
Monessen,Pa. P17 ..... 5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 .... 6.60
Portsmouth,O. P12 .... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 .. 5.90
Sterling,Ill.(1) N15 ... 5.80
Sterling,Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 .... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Atlanta A11 ..... 5.20
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.00
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala T2 ..... 5.00
Fontana,Calif. K1 .... 5.75
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor,Ind. I-2 .... 5.00
Johnstown,Pa. B2 ..... 5.05
Joliet,Ill. P22 ..... 5.00
KansasCity,Mo. S5 .... 5.10
Lackawanna,N.Y. B2 .. 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 .... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 ... 5.85
Portland,Oreg. O4 .... 5.75
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14 .5.00
S.SanFrancisco B3 .... 5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 .... 5.70
Weirton,W.Va. W6 .... 5.00

Wide Flange

Bethlehem,Pa. B2 .... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 ... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 .... 8.10
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 .... 7.45
Lackawanna,N.Y. B2 .. 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14. .7.35
S.SanFrancisco B3 .... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Lackawanna,N.Y. B2 .. 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.05
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Lackawanna, N.Y. B2 .. 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago, Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky.(15) A10 .. 4.85
Bessemer,Ala. T2 ..... 4.85
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 .... 5.70
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 .. 4.95
Detroit M1 ..... 4.95
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 .. 5.60
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 .... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .. 4.85
LoneStar,Tex. L6 ..... 5.20
Minnequa,Colo. C10 .... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. A2 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14 4.85
SparrowsPoint,Md. B2.. 4.85
Sterling,Ill. N19 ..... 4.85
Steubenville,O. W10 .... 4.85
Warren,O. R2 ..... 4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont, Del. C22 .... 6.20
Fontana,Calif. K1 ..... 7.00
Geneva,Utah C11 ..... 6.25
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 .... 11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 ..... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 .. 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1.. 8.00
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1.. 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14.. 7.25
SparrowsPoint,Md. B2 .. 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 .... 7.25

PLATES, Alloy

Aliquippa,Pa. J5 ..... 6.85
Claymont,Del. C22 .... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 .. 7.60
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 .... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. A2 ..... 6.85
Pittsburgh J5 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14.. 6.85
SparrowsPoint,Md. B2 .. 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 .. 5.925
Harrisburg,Pa. P4 .... 6.275
Ind.Harbor,Ind. I-2 .. 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 .... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10.. 5.10
Ashland l.c.l. (15) A10.. 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .. 5.075
Aliquippa,Pa.(9) J5 ... 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.275
Bessemer,Ala.(9) T2 .. 5.075
Birmingham(9) C15 ... 5.075
Bridgeport,Conn. N19 .. 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa.(9) U5 .... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 .... 5.175
Emeryville,Calif. J7 .... 5.825
Fairfield,Ala.(9) T2 .. 5.075
Fairless,Pa. (9) U5 .... 5.225
Fontana,Calif.(9) K1 .. 5.775
Gary,Ind.(9) U5 ..... 5.075
Houston(9) S5 ..... 5.325
Ind.Harbor(9) I-2, Y1.. 5.075
Johnstown,Pa.(9) B2 .. 5.075
Joliet,Ill. P22 ..... 5.075
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 .... 5.075
LosAngeles(9) B3 .... 5.775
Milton,Pa. M18 ..... 5.225
Minnequa,Colo. C10 ... 5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 .... 5.825
Seattle B3, N14 ..... 5.825
S.Ch'e'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5.. 5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 .... 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Tonawanda,N.Y. B12 .. 5.45
Torrance,Calif.(9) C11 5.775
Youngstown (9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.125
Bethlehem,Pa. B2 .... 6.125
Bridgeport,Conn. N19 .. 6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 6.125
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 .... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .... 6.125
KansasCity,Mo. S5 .... 6.375
Lackawanna,N.Y. B2 .. 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
Pittsburgh J5 ..... 6.125
S.Chicago R2,U5,W14 .. 6.125
S.Duquesne,Pa. U5 .... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.425
Bridgeport,Conn. N19 ... 7.50
Clairton, Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 .... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind.Harbor,Ind. Y1 .... 7.425
Johnstown,Pa. B2 .... 7.425
KansasCity,Mo. S5 .... 7.675
Lackawanna,N.Y. B2 .. 7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 .... 7.425
S.SanFrancisco B3 .... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2.. 5.225
Houston(9) S5 ..... 5.325
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 .... 5.075
Sterling,Ill. N15 ..... 5.175
Sterling,Ill.(1) N15 .... 5.075
Tonawanda,N.Y. B12 ... 5.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Joliet,Ill. P22 ..... 5.075
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 ..... 6.45
Pittsburgh J5 ..... 6.20
Youngstown U5 ..... 6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 .... 9.475
BeaverFalls,Pa. M12 .. 9.475
Chicago W18 ..... 9.475
Cleveland C20 ..... 9.475
LosAngeles S30 ..... 11.10
LosAngeles P2 ..... 11.35
Monaca,Pa. S17 ..... 9.475
Newark,N.J. W18 ..... 9.65
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 6.85
BeaverFalls,Pa. M12,R2. 6.85
Birmingham C15 ..... 7.45
Bridgeport,Conn. N19 .. 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 .... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.85
Donora,Pa. W8 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPark,Ill. N5 ... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 ..... 6.85
Hammond,Ind. L2, M13. 6.85
Hartford,Conn. R2 ..... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) S30 .... 8.30
LosAngeles R2 ..... 8.75
LosAngeles P2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 ... 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 .... 7.10
Putnam,Conn. W18 .... 7.40
Readville,Mass. C14 .... 7.40
S.Chicago,Ill. W14 .... 6.85
SpringCity,Pa. K3 .... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 .... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19. 6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 ..... 8.325
Bridgeport,Conn. N19 .. 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 8.325
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 .... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 8.325
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 .. 8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 .... 8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 .... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 .. 8.325
LosAngeles S30 ..... 10.10
LosAngeles P2 ..... 10.20
Mansfield,Mass. B5 .... 8.625
Massillon,O. R2, R8 ... 8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 .... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 .... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 .... 8.625
Youngstown F3, Y1 .... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.275
Birmingham C15 ..... 5.075
Bridgeport,Conn. N9 ... 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 .... 5.825

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex. (4) T4..5.525
Gary,Ind U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.825
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....8.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 ..5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.65
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
New York U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) S19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ..18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 ....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit, M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 .8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	..6.65	7.15
Fairfield T2	.....6.65	6.90
Gary,Ind. U5	....6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	..6.65	6.90
Irvin,Pa. U5	....6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	....6.65	...
Pitts.,Calif.	C11..7.40	...
SparrowsPt. B2	..6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 ....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.675
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston,Ill. M22	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NowKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	6.95
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	....	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Evanston,Ill. M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	17.10	20.95	25.30
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.45	21.30	25.65
Harrison,N.J. C18	17.10	20.95	25.30
New York W3	17.10	20.95	25.30
Palmer,Mass. W12	17.10	....	....
Trenton,N.J. R5	17.10	20.95	25.30
Worcester,Mass. A7, T6	17.10	20.95	25.30
Youngstown C8	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.00	12.05	13.05
Brackenridge,Pa. A4	....	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	....	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	....	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	....	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SPcoils)	....	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg,Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.90
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.95
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.65
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.70
Trenton,N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie,Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.975
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	9.025
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.45
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.45
Kokomo,Ind. C16	14.45
Monessen,Pa. P6	14.20
Muncie,Ind. I-7	14.65
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.80
Waukegan,Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE

Bartonville,Ill. K4	12.00
Buffalo W12	12.00
Fostoria,O. S1	12.00
Johnstown,Pa. B2	12.00
Monessen,Pa. P7	11.55
Muncie,Ind. I-7	12.20
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md. B2	12.10
Struthers,O. Y1	12.00
Worcester,Mass. J4	12.30

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	.164
Aliquippa,Pa. J5	.164
Atlanta A11	.166
Bartonville,Ill. K4	.166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
KansasCity,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C10	.169
Monessen,Pa. P7	.164
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (7) N15	.166
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago W13	.164
Cleveland A9	.170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler
(14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville Ill. K4	9.63
Buffalo W12	*9.82*
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	*10.15*
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
LosAngeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.95
SparrowsPt.,Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim	
AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	*10.20*
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.45
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	.190
Atlanta A11	.192
Bartonville,Ill. K4	.192
Crawfordsville,Ind. M8	.192
Donora,Pa. A7	.196
Duluth A7	.196
Fairfield,Ala. T2	.196
Houston S5	.195
Jacksonville,Fla. M8	.197
Joliet,Ill. A7	.190
KansasCity,Mo. S5	.195
Kokomo,Ind. C16	.198
Minnequa,Colo. C10	.195
Pittsburg,Calif. C11	.220
S.Chicago,Ill. R2	.190
S.SanFrancisco C10	.214
Sterling,Ill. (7) N15	.196
SparrowsPt.,Md. B2	.198
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington.W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
Sterling,Ill.(1) N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184**
Al'quippa,Pa. J5	.181‡
Atlanta A11	.190*
Bartonville,Ill. K4	.190
Crawfordsville,Ind. M8	.190
Donora,Pa. A7	.184†
Duluth A7	.184†
Fairfield,Ala. T2	.184†
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.195
Johnstown,Pa. B2	.188*
Joliet,Ill. A7	.184†
KansasCity,Mo. S5	.189**
Kokomo,Ind. C16	.186†
Minnequa,Colo. C10	.189**
Monessen,Pa. P7	.188*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.184†
S.Chicago,Ill. R2	.184**
S.SanFrancisco C10	.204**
SparrowsPoint,Md. B2	.190*
Sterling,Ill.(7) N15	.190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	.176**
Aliq'ppa,Pa. 9-14½ga. J5	179‡
Atlanta A11	.182*
Bartonville,Ill. K4	.182
Crawfordsville,Ind. M8	.182
Donora,Pa. A7	.176†
Duluth A7	.176†
Fairfield,Ala. T2	.176†
Houston,Tex. S5	.181**
Jacksonville,Fla. M8	.187
Johnstown,Pa.(43) B2	.180*
Joliet,Ill. A7	.176†
KansasCity,Mo. S5	.181**
Kokomo,Ind. C16	.178†
Minnequa,Colo. C10	.181**
Monessen,Pa. 9 ga. P7	.180*
Pittsburg,Calif C11	.199†
Rankin,Pa. A7	.176†
S.Chicago,Ill. R2	.176**
Sterling,Ill.(7) N15	.182*

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	15.70	17.25**
Aliq'ppa,Pa. J5	.15.70	17.50
Bartonville K4	.15.80	17.75
Buffalo W12	.16.10	....
Cleveland A7	.16.00	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	.16.50	18.05†
Houston S5	.15.95	17.50**
Jacksonville M8	.16.05	18.00
Johnstown B2	.16.00	17.95*
Kan.City,Mo. S5	15.95	....
Kokomo C16	.16.10	17.65†
Minnequa C10	.16.25	17.80*
P'lm'r,Mass. W12	16.30	17.85†
Pitts.,Calif. C11	.16.35	17.90†
SparrowsPt. B2	16.10	18.05*
Sterling(37) N15	16.00	17.95*
Waukegan A7	.16.00	-17.55†
Worcester A7	.16.30	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	....7.95	8.475‡
Atlanta (48) A11	8.05	8.65*
Bartonville(48) K4	.8.05	8.65
Buffalo W12	....8.20	8.75†
Cleveland A7	....8.20	....
Crawfordsville M8	.8.05	8.65
Donora,Pa. A7	..8.20	8.75†
Duluth A7	.....8.20	8.75†
Fairfield T2	.....8.20	8.75†
Houston(48) S5	..8.45	9.00**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	8.20	8.95*
Joliet,Ill. A7	....8.20	8.75†
Kans.City(48) S5	8.45	9.00**
Kokomo C16	....8.30	8.85†
LosAngeles B3	..9.15	9.90*
Minnequa C10	....8.45	9.00‡
Monessen P7(48)	.7.95	8.55*
Palmer,Mass. W12	8.50	9.05†
Pitts.,Calif. C11	..9.15	9.70†
Rankin,Pa. A7	..8.20	8.75†
S.Chicago R2	..7.95	8.35**
S.SanFran. C10	..9.15	9.70*
Spar'wsPt. B2(48)	8.30	9.05*
Sterling(37)(48)	N15 8.35	9.10
Struth'rs,O.(48)	Y1 8.20	8.85‡
Worcester,Mass.	A7 8.50	9.05†

Based on zinc price of: *13.50c. †5c. ‡10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Lower than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine,Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1⅛ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0
Stove Bolts, Slotted	
⅛ to ¼-in. incl., 3 in. and shorter	54.00
⅛ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:	
All sizes	58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:	
¼ in. and smaller	61.5
⅜ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0
Hex Nuts, Reg. & Heavy, Cold Punched:	
¼ in. and smaller	61.5
⅜ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, All Types, Hot Galvanized:	
¼ in. and smaller	48.0
⅜ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¼ in. and smaller	61.5
⅜ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, Finished (Incl. Slotted and Castellated):	
1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0
Longer than 6 in.:	
⅝ in. and smaller	+6
¾, ⅞ and 1 in. diam.	+24

Flat Head Cap Screws:
¾ in. and smaller. +65.0
Set Screws, Square Head, Cup Point, Coarse Thread
Through 1 in. diam.:

6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
7/8-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2½	12	44.42	52.03	41.81
2½	12	48.94	57.31	46.05
2¾	12	52.99	62.05	49.88
3	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	....(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2, Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.33c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Josiyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb
Regular Carbon	0.290
Extra Carbon	0.345
Special Carbon	0.41-0.45
Oil Hardening	0.450

Grade	$ per lb
Cr Hot Work	0.45-0.495
W-Cr Hot Work	0.43-0.475
V-Cr Hot Work	0.460
HI-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	66.00	66.50	67.00	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extras; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	*103.50*
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, $9 frgt allowed K2	*106.50*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††*		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.70	11.30	12.49	....	9.80	9.95	10.65	18.89	9.80	9.70	11.40
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.80	9.75	10.99	....	8.85	9.15	9.15	15.00	8.90	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	9.20	11.20	11.60	55.20	11.05‡‡	9.35	13.80	14.60	9.35	9.00	12.20
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.39	9.59	10.31	....	8.43	8.68	9.21	....	8.94	8.90	10.10
San Francisco	9.05	10.40	10.90	53.45	9.05	9.15	12.40	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

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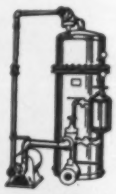
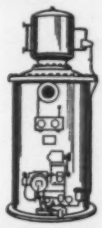


Chemical Filtration



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Improved product appearance...

You can design with unrestricted imagination when you plan to use metal stampings for parts or complete assemblies. Simple and complex forms can be combined in a single stamping to add new beauty... increase functional efficiency... reduce production operations.

Lighter weight...

Bossert can produce stampings in any metal or alloy, so you can take advantage of the weight-saving features of new, lighter metals. You can often replace a bulky, heavy casting or forging with a stamping, without sacrificing strength or durability.

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Stamped parts, assembled by welding, brazing, riveting or screw fastenings make a stronger unit, and are usually lighter and more attractive. Bossert's re-design department often develops stampings for parts and assemblies that were formerly cast or forged or machined, with substantial savings in costs.

Lower production costs...

In most cases, metal stampings can be produced with fewer production operations. They can often be formed in one piece, with holes punched to exact dimensional accuracy. This eliminates separate drilling, machining and assembling operations... and results in lower manufacturing costs.

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Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $135; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Pa., Orviston, Pa., $305.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Pa., Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34-$35; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.80-45.00†
Bronze, 5000-lb lots	44.70-59.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	54.70-66.40†
Phosphor-Copper, 5000-lb lots	64.00
Copper (atomized) 5000-lb lots	46.50-54.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.00
Less than 1000 lb	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **84% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5¼	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.50	7.50	7.50	7.75
Channels	7.70	7.70	7.70	7.95
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.90	6.90	6.90	7.35
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57
Oil Country Pipe: Mills withdrawn temporarily.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$24.00-26.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-$1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

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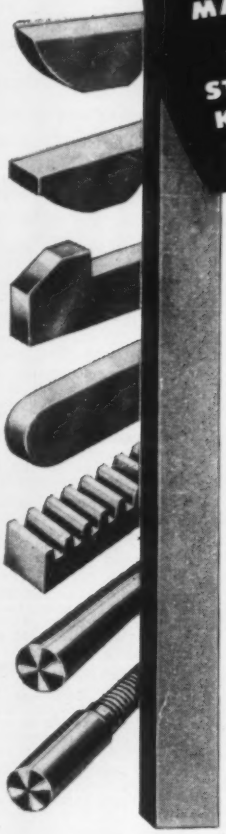

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Cleveland, O. Los Angeles, Calif.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $225, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Grade Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50 per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; Freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

Scrap Prices Beginning To Stabilize

Index on the steelmaking grades slips to $42.50 but drop of 17 cents from week preceding is less sharp than that in the preceding 11 weeks. Buying continues limited

Scrap Prices, Page 254

Pittsburgh — Although major mill purchases are lacking, brokers are paying higher prices for quality No. 1 heavy melting steel. They think the market will move upward on the next representative mill purchase. Sale of No. 1 factory bundles by a local automotive stamping plant, scheduled for last week end, is expected to set the market pace.

Weakness continues in stainless scrap.

Philadelphia—Scrap prices are unchanged, except for a drop in machine shop turnings to $32-$33, delivered; in couplers, springs and wheels to $58; and in heavy breakable cast to $54. The firmer market tone is ascribed to light receipts at dealers' yards.

The rail rate on steel scrap, Springfield, Mass., to Phillipsdale, R. I., has been reduced from $4.82 to $3.90 a gross ton.

New York—Except for $1 reduction on No. 2 bundles to $29-$30, brokers' buying prices are unchanged.

Boston—Prices appear to have stabilized, at least temporarily. Brokers are paying $35-$36, shipping point, for No. 1 heavy melting. Belatedly, the cast iron grades have followed the decline in the steel grades. Mixed cupola is quoted at $33, shipping point, off nearly $3 a ton. The movement of all grades is light. For delivery dock, for export, prices are nominally $1 to $1.50 higher on the steel grades, loaded on vessels.

Chicago—The scrap market here is holding unchanged. During the past week price fluctuations have been negligible, but buying has been light. A steelmaking rate which appears to be dropping below 90 per cent of capacity operates to depress scrap consumption. Consumers say plenty of scrap is available, and this makes large scale buying unnecessary.

Cleveland—Prices quoted on the steelmaking grades are nominal in the absence of representative mill buying. Tonnage is moving to the mills on old orders placed at higher prices here and in the Valley. Brokers are meeting some difficulty in covering their commitments because of limited dealer supplies. Generally, the market tone appears a trifle stronger, but the trend for the coming weeks will depend on prices developed on month-end auto lists. Some traders think they will move at lower prices than were paid at the end of March.

Youngstown—The scrap market continues on the slow side. No. 1 heavy melting is nominally $42; No. 2 heavy melting about $37; and No. 2 bundles $35. Railroad scrap also is quoted lower.

Detroit—Scrap prices are soft,

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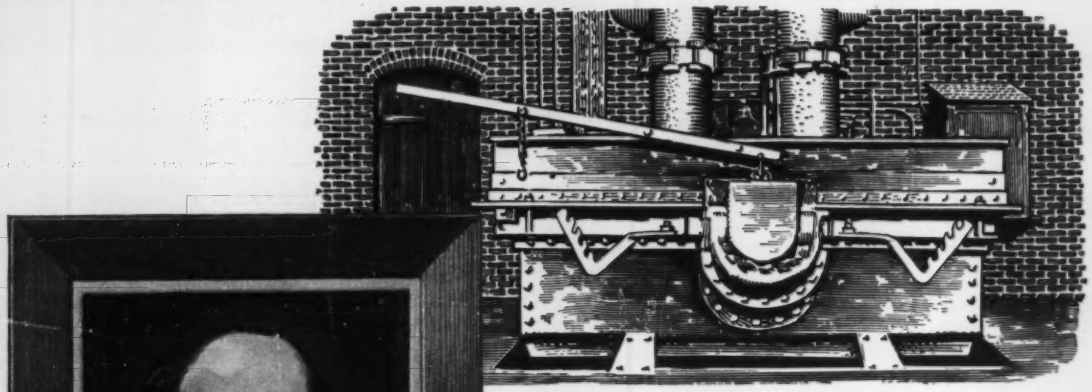
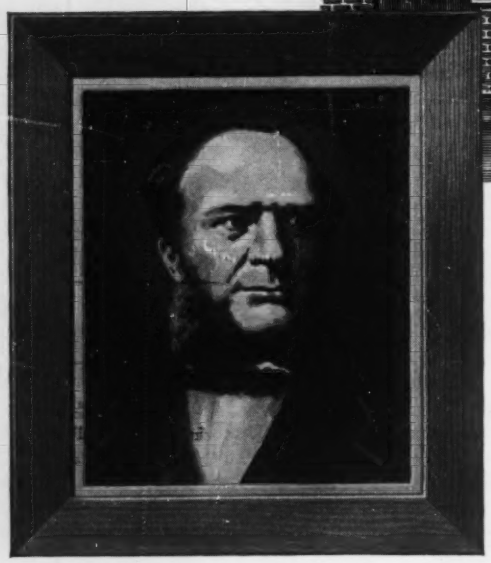
GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING





Sir William Siemens

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1878

First Practical Application of Electricity to Steel

Although Sir William Siemens made many successful contributions to industry — the water meter, double cylinder pump, anastatic printing process, among others — his most important effort was the first practical application of electricity to the melting of steel.

Ironically, his associates, while recognizing the value of his theory, did not share his confidence. Said one, "His electric furnace, although it has not as yet, and possibly never may become a practical appliance, is yet of much interest . . ."

That it has become a "practical appliance" is given full testimony by the companies which in 1956 produced a total of 9,147,567 net tons of the finest steel by the electric arc furnace process.

Commercially, Siemens' furnace did not work out. Electric current in those days was too expensive. But he laid the groundwork for the later developments of other inventors, particularly Heroult, who saw his first electric arc furnace installed in America in 1906.

Approximately 98 percent of the charge used in electric furnaces is scrap. This scrap requires known analysis — a problem we are more than qualified to solve because of our experience, personnel, equipment, and the strategic location of our offices. We would like to put our facilities to work for you.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

and a further drop of $1 to $2 a ton at month's end would not be surprising. Activity is limited at dealers' yards. Slower foundry operations are depressing the cast iron grades. Lack of orders puts prices on most cast items on a nominal basis.

Buffalo—Cast iron scrap prices are lower here. Cupola cast sold at $40, off $2 a ton, and No. 1 machinery cast is down $1, now being quoted at $45. Prices on the steel mill grades are steady, and dealers anticipate little change during May. Resumption of operations at the Wickwire Spencer steel mill, which has been strike-bound, will broaden demand for steel scrap here. Another local mill continues out of the market.

Cincinnati—No new purchases of scrap are reported here, and the market lacks a test. The undertone still is weak with slower steelmaking operations in the area.

Birmingham — Most consumers are well supplied with scrap and are limiting new purchases to small tonnages. Dealers are resisting offering prices, and some brokers are finding it difficult to cover current orders. Brokers predict further price declines. Electric furnace scrap prices are holding.

San Francisco—Activity in the steel scrap market here has slowed down, and there are indications that price postings at the opening of May will be slightly below those prevailing in the closing weeks of April.

Seattle—No further prices declines are noted here, but the market continues weak. Dealers expect a further drop in quotations. No. 1 and No. 2 heavy melting steel are nominally $48 and $45.

Export demand is not too active. Large tonnage is moving on old contracts, but Japanese buyers are holding back new orders due to tight foreign exchange and the recent downtrend in scrap prices. Receipts are slowing up at tidewater.

Los Angeles—Scrap prices declined an average of $1 a ton, and a further reduction is thought likely. No. 1 heavy melting is quoted at $54; No. 2 heavy melting at $50; and No. 1 bundles at $53. Machine shop turnings are off $2, being quoted at $34.

Scrap Exports Rise in 1956

Exports of ferrous scrap hit a record-breaking 6 million net tons last year, reports the Business & Defense Services Administration. In 1955, 5 million net tons were exported, in 1954 1.58 million. The material moved chiefly to the European Coal & Steel Community, Japan, Canada and the United Kingdom—in that order.

Steel product exports (4.2 million net tons) were equivalent to 5 per cent of total shipments from domestic mills last year. They were larger than in any year since 1949. Of the total, 39 per cent went to Canada.

Imports of steel last year (1.3 million tons) were larger than in any year since 1953. They came in principally through ports on the western Gulf Coast and in Florida and New York. Bars and tool steel made up nearly 30 per cent of the total. Others: Heavy structural shapes, 23.6 per cent; wire and wire products, 20 per cent; and steel pipe and tubing, 10 per cent.

Iron Ore . . .

Iron Ore Prices, Page 248

Shipments of Lake Superior iron ore from upper lake ports totaled 805,196 gross tons in the week ended Apr. 22, reports the Lake Superior Iron Ore Association. This compares with 531,538 tons moved in the preceding week and 1,688,734 tons in the corresponding week a year ago. Cumulative shipments to Apr. 22 this year are 1,381,907 tons, against 2,863,985 tons up to that date in

(*Please turn to page* 259)

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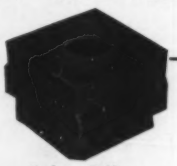

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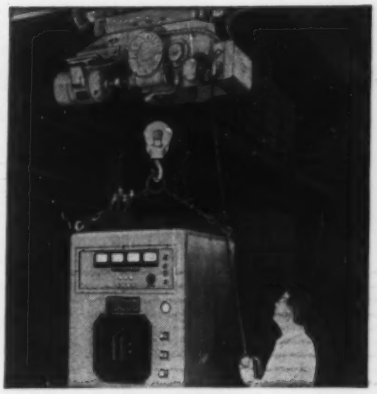

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Certified ANALYSIS

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Apr. 24, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 24	$42.50
Apr. 17	42.67
Mar. Avg.	49.63
Apr. 1956	54.90
Apr. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	*46.00-47.00*
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	34.00-35.00
No. 1 busheling	41.00-42.00
Machine shop turnings	28.00-29.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	32.00-33.00
Cast iron borings	32.00-33.00
Cut structurals, 3 ft. lengths	46.00-47.00
Cut structurals, 2 ft. and under	47.00-48.00
Heavy turnings	36.00-37.00
Punchings & plate scrap	46.00-47.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-47.00
Rails, 2 ft and under	*62.00-63.00*
Rails, 18 in. and under	*63.00-64.00*
Rails, random lengths	*59.00-60.00*
Railroad specialties	*57.00-58.00*

Stainless Steel Scrap

18-8 bundles & solids	*320.00-330.00*
18-8 turnings	*220.00-230.00*
430 bundles & solids	85.00-90.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 1 factory bundles	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	32.00-33.00
No. 1 busheling	38.00-39.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut foundry steel	43.00-44.00
Cut structurals, plates 2 ft and under	49.00-50.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	29.00-30.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	37.00-38.00
Heavy breakable cast	37.00-38.00
Stove plate	44.00-45.00
Unstripped motor blocks	30.00-31.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	35.00-36.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	61.00-62.00
Cast steel	55.00-56.00
Railroad specialties	59.00-60.00
Uncut tires	58.00-59.00
Angles, splice bars	59.00-60.00
Rails, rerolling	67.00-68.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	310.00-320.00
18-8 turnings	210.00-220.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.50-36.50
No. 1 bundles	41.00-42.00
No. 2 bundles	33.00-34.00
No. 1 busheling	41.00-42.00
Machine shop turnings	22.00-23.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	42.00-43.00
Electric furnace bundles	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00

CHICAGO

No. 1 hvy melt, indus.	41.00-42.00
No. 1 hvy melt, dealer	*38.00-39.00*
No. 2 heavy melting	35.00-36.00
No. 1 factory bundles	44.00-45.00
No. 1 dealer bundles	*39.00-40.00*
No. 2 bundles	32.00-33.00
No. 1 busheling, indus	41.00-42.00
No. 1 busheling, dealer	*38.00-39.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft.	46.00-47.00
Punchings & plate scrap	47.00-48.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	53.00-54.00
Rails, rerolling	56.00-57.00

Stainless Steel Scrap

18-8 bundles & solids	330.00-340.00
18-8 turnings	230.00-240.00
430 bundles & solids	75.00-80.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	35.00-36.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	*44.00*
Charging box cast	*38.00*
Stove plate	*40.00*
Heavy breakable	*36.00*
Unstripped motor blocks	*23.00*
Clean auto cast	*47.00*
Malleable	*50.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.50
No. 2 heavy melting	37.00
No. 1 bundles	39.50
No. 2 bundles	32.00
No. 1 busheling	39.50
Machine shop turnings	24.00
Short shovel turnings	29.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.50
Rails, 18 in. and under	59.00
Rails, rerolling	58.00
Rails, random lengths	51.00
Angles, splice bars	53.00

PHILADELPHIA

No. 1 heavy melting	46.00
No. 2 heavy melting	38.00
No. 1 bundles	46.00
No. 2 bundles	36.00
No. 1 busheling	46.00
Electric furnace bundles	51.00
Mixed borings, turnings	35.00
Short shovel turnings	36.00-37.00
Machine shop turnings	*32.00-33.00*
Heavy turnings	42.00
Structural & plate	51.00-53.00
Couplers, springs, wheels	*58.00*
Rail crops, 2 ft & under	65.00-66.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy brakable cast	*54.00*
Malleable	62.00
Drop broken machinery	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	42.00-43.00
No. 2 bundles	*29.00-30.00*
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Low phos. (structurals & plate)	46.00-47.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Unstripped motor blocks	31.00-32.00
Heavy breakable	45.00-46.00

Stainless Steel

18-8 sheets, clips solids	360.00-370.00
18-8 borings, turnings	260.00
430 sheets, clips, solids	88.00-90.00
410 sheets, clips, solids	70.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*30.00-30.50*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*35.00-36.00*
Machine shop turnings	*20.00-20.50*
Mixed borings, turnings	23.00-24.00
Short shovel turnings	24.00-25.00
No. 1 cast	*34.00-35.00*
Mixed cupola cast	*33.00-34.00*
No. 1 machinery cast	*42.00-43.00*

BUFFALO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	41.00-42.00
No. 2 bundles	34.00-35.00
No. 1 busheling	41.00-42.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	45.00-46.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*39.00-40.00*
No. 1 machinery	*44.00-45.00*

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	37.00-38.00
No. 2 bundles	28.00-29.00
No. 1 busheling	37.00-38.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	27.00-28.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	48.00-49.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	64.00-65.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	40.00-41.00
No. 2 bundles	23.00-24.00
No. 1 busheling	40.00-41.00
Cast iron borings	26.00-27.00
Short shovel turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Bar crops and plate	46.00-47.00
Structurals & plate	*44.00-45.00*
Electric furnace bundles	43.00-44.00
Electric furnace:	
3 ft and under	*41.00-42.00*
2 ft and under	*42.00-43.00*

(F.o.b. shipping point)
Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	*34.00-35.00*
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	53.00-54.00
Rails, rerolling	59.00-60.00
Rails, random lengths	48.00-49.00
Angles, splice bars	52.00-53.00

SEATTLE

No. 1 heavy melting	48.00
No. 2 heavy melting	45.00
No. 1 bundles	45.00
No. 2 bundles	28.00-30.00
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00

Cast Iron Grades

No. 1 cupola	50.00
Heavy breakable cast	48.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant	42.00

LOS ANGELES

No. 1 heavy melting	*54.00*
No. 2 heavy melting	*50.00*
No. 1 bundles	*53.00*
No. 2 bundles	*36.00*
Machine shop turnings	*34.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	51.00
No. 2 heavy melting	46.00
No. 1 bundles	50.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	57.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory: Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

LOGEMANN

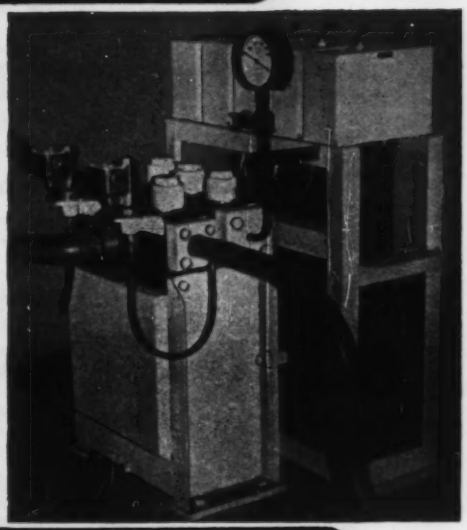
LOGEMANN Metal Balers

. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

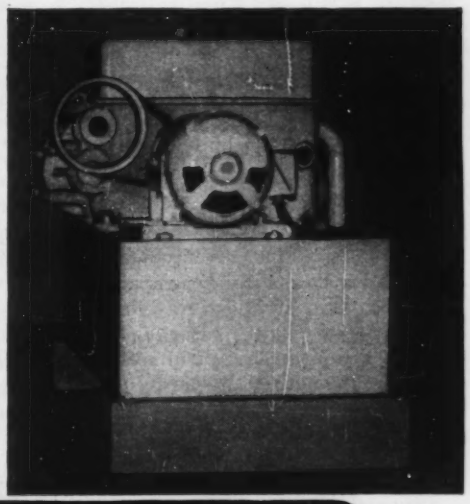
Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Metals Men Spur Research

Finding new uses and expanding old ones are answers to the oversupply of most nonferrous metals. Even civilian nickel consumption must increase 75 per cent by 1961

Nonferrous Metal Prices, Pages 258 & 259

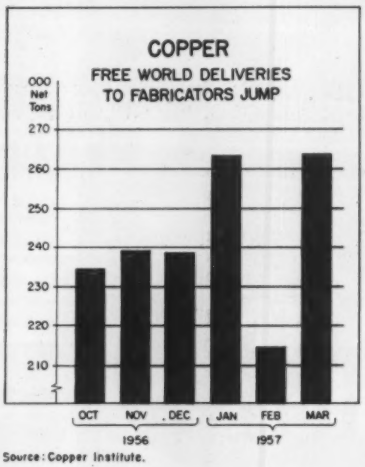
OVERSUPPLY has nonferrous people talking about hard selling and the need for additional research and development programs.

Nickel — John F. Thompson, chairman, International Nickel Co. of Canada Ltd., told stockholders recently: "It is expected that Free World nickel producing capacity in 1961 will be about 325,000 to 337,500 tons. Assuming defense demand remains at present levels and that nickel is not taken for government stockpile in 1961, the 1956 rate of world civilian consumption will have to be increased by more than 75 per cent to absorb the expanded output." Inco's estimated share of the Free World production total in '61: 192,500 tons. Predicts Chairman Thompson: "It is evident that a huge new demand for nickel must be stimulated. We have been developing new markets and applications for many years . . . these efforts must be intensified."

Aluminum — Primary producers are putting on an all-out campaign to woo the architectural field. Experimental homes featuring expanded aluminum usage will spring up throughout the U.S. during the third and fourth quarters. New automotive applications, including an aluminum brake drum, will be announced as some of the details of 1958 automobiles become known.

U.S. production of primary aluminum reached 135,733 tons in March. The February total was off (119,059 tons) due to the interruption of power in the Pacific Northwest. The record month was July, 1956, when 151,624 tons were produced. First quarter total: 401,822 tons. During the first quarter of last year, 419,051 tons were produced.

Copper—Industry sources reveal that copper men are becoming vitally interested in helping users expand applications. Research dollars are becoming more readily available. Says one industry source: "Look for the announcement of joint research efforts of producers and users."



Source: Copper Institute.

While copper is in oversupply, expansion programs are going ahead as scheduled. "You could say we are optimistic over the long range, conservatively optimistic about 1957," says one sales manager.

Brass Mills—Users of brass mill products are expecting and getting fast delivery on almost any order. Most mills admit that orders are showing some improvement but warn that if the summer dropoff in orders is severe, it could create a serious situation. J. M. Kennedy, chairman, Revere Copper & Brass Inc., New York, reports: "We expect no immediate improvement in business volume in the copper and brass fabricating industry until there is an improvement in the housing, automotive and other copper consuming industries."

Copper Institute figures for March helped bolster sagging spirits. Free World deliveries to fabricators jumped from 214,796 tons in February to 263,271 tons in March (see chart). U.S. deliveries to fabricators rose from 101,565 to 113,571 tons. Free World refined stocks were down to 369,256 tons, a reduction of about 1000 tons. U.S. refined stocks were 140,191 tons, up 3689 tons over the February total. U.S. March refined production was up 9670 tons.

Lead, Zinc—R. Hendricks, vice president-sales, Consolidated Mining & Smelting Co. of Canada Ltd., told the joint session of the American Zinc Institute and Lead Industries Association (Chicago, Apr. 23-26): "Without some new applications to balance off the loss of even part of one of the major present uses for lead, the outlook could be gloomy. We of the lead and zinc industries cannot afford to wait until this happens to either metal. If we are to increase consumption, the lead and zinc producers must engage in extensive research individually, in

NONFERROUS PRICE RECORD

	Price Apr. 24	Last Change		Previous Price	Mar. Avg.	Feb. Avg.	Apr., 1956 Avg.
Aluminum ..	27.10	Aug.	10, 1956	25.90	27.100	27.100	24.650
Copper	31.00–32.00	Apr.	13, 1957	31.50–32.00	31.462	32.363	47.500
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug.	13, 1956	33.75	35.250	35.250	33.150
Nickel	74.00	Dec.	6, 1956	64.50	74.000	74.000	64.500
Tin	100.00	Apr.	23, 1957	99.75	99.683	101.159	99.270
Zinc	13.50	Jan.	6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

co-operation with each other and with consumers."

B. B. Steiner, president, Association of American Battery Manufacturers Inc., predicted that 387,000 tons of lead will be used in storage batteries in 1957. This is an increase of 21,000 tons over the 1956 total. Average automobile battery weight: 20.11 lb.

Dr. C. E. Crompton, associate technical director, National Lead Co. of Ohio, told delegates: "Lead's attenuation of gamma rays from reactor-produced radioisotopes and radiation from reactors themselves account for its major use as protection for personnel and equipment." Other uses: Housing of radiation sources in cameras for industrial radiography and medical therapy and mobile high intensity fission product sources for food preservation.

Future demands for lead: Some 5000 to 10,000 tons may be used annually by 1965 for reactor shielding. By 1964, radioactive isotopes will account for about 1000 tons a year and about 2000 tons will be needed to reprocess reactor fuel elements.

Summary—Lead and zinc men may be on the verge of initiating programs to prove that applied research to expand applications and find new ones may help make both metals competitive with other materials.

Market Memos

• World tin production was 177,600 long tons during 1956. In 1955, output was 180,243 tons. Leading producers: 1. Malaya, 62,295 long tons. 2. Indonesia, 30,054 long tons. 3. Bolivia, 26,843 long tons. The tin market is still dull. Spot tin can be purchased for about $1 a pound at New York. Tin platers continue to order from hand to mouth.

• Union Carbide & Carbon Corp. has announced plans for mining titanium minerals on Amelia island, 30 miles northeast of Jacksonville, Fla. Construction of a processing mill and auxiliary equipment will start shortly, and mining is expected to begin in the spring of 1958. The area contains reserves of ilmenite, rutile, zircon and monazite.

TRADE-MARKS WHICH IDENTIFY THE ORIGINAL AND THE BEST

"PHOSPHOR BRONZE."®

Phosphor Bronze®

ELEPHANT BRAND®

A little more than seventy-five years ago a wonderful new kind of copper and tin alloy possessing high tensile strength, great resiliency and unusual corrosion-resistant properties was introduced to American industry. This new bronze alloy had been perfected by the addition of a small amount of phosphorus to the copper and tin mixture.

No other producer of metals in the United States was able to duplicate this extraordinarily useful alloy. Therefore, because of the uniqueness of this new phosphorus-bearing alloy, the smelters responsible for its creation gave it a trade name "PHOSPHOR BRONZE" and adopted for itself the firm name of The Phosphor Bronze Smelting Company.

This was the first Phosphor Bronze ever produced in the United States of America.

"Phosphor Bronze" was immediately accepted by America's burgeoning industry. Demand for the new alloy grew by leaps and bounds and The Phosphor Bronze Smelting Company soon had many imitations of its products. So, to protect customers from spurious imitations, the trade name of "Phosphor Bronze" was incorporated into two distinctive *trademarks* which were duly registered in the U. S. Patent Office on February 21, 1888. These trade-mark registrations have been maintained, in full force, throughout the intervening years and are presently owned by The Seymour Manufacturing Company.

In time, new variations of the original "Phosphor Bronze" alloy were introduced by the now-famous smelting Company. To identify these, the trade name of "ELEPHANT BRAND" was adopted, together with a distinctive picture of an elephant. The words "ELEPHANT BRAND" were incorporated into a *trade-mark* and registered with the U. S. Patent Office on August 20, 1907. The picture of the elephant shown in this advertisement, is a new one, designed to supersede its 1906 predecessor and was Registered, as a *trademark,* on October 2, 1956.

We are proud that American industry has wholeheartedly accepted our product. The name "PHOSPHOR BRONZE" has become internationally known and is familiar to metalworking men and metallurgists everywhere.

We—the officers, stockholders and employees of The Seymour Manufacturing Company endorse the action of The Phosphor Bronze Corporation in bequeathing this name to the American metalworking industries. We reserve only . . . the exclusive right to use the trademarks illustrated above.

THE SEYMOUR MANUFACTURING COMPANY

Successors to The Phosphor Bronze Corporation

SEYMOUR, CONNECTICUT

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot, 100.125; prompt, 100.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.25-28.75; No. 12 foundry alloy (No. 2 grade), 21.50-22.50; 5% silicon alloy, 0.60 Cu max., 24.25-25.00; 13 alloy, 0.60 Cu max., 24.25-25.00; 195 alloy, 24.00-25.75; 108 alloy, 22.00-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 9.50-10.00; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	35.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.68	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 9.50-10.00; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 24.00-24.50; No. 2 heavy copper and wire, 22.50-23.00; light copper, 20.50-21.00; No. 1 composition red brass, 21.00-21.50; No. 1 composition turnings, 20.50-21.00; yellow brass turnings, 12.00-12.75; new brass clippings, 19.00-19.50; light brass, 12.00-12.50; heavy yellow brass, 14.50-15.00; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.50-16.00; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 50.00-55.00; old sheets, 50.00-55.00; turnings, 45.00-50.00; rods, 50.00-55.00.

Nickel: Sheets and clips, 85.00-125.00; rolled anodes, 85.00-125.00; turnings, 75.00-115.00; rod ends, 85.00-125.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.50-17.50; 5052 clippings, 16.50-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50-14.00; old cast, 13.50-14.00; clean old cable (free of steel), 16.50; borings and turnings, 14.00-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper 22.75; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 16.50; yellow brass turnings, 18.00; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums. **Chromic Acid:** 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66. 40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (anhydrous): Less than 25 lb, 168.30; 25 lb, 133.30; 100 lb, 118.30; 400 lb, 115.90; 5200-19,600 lb, 103.70; 20,000 lb or more, 91.50.

Stannous Sulphate: Less than 50 lb, 131.00; 50 lb, 101.00; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page 253*)

the 1956 lake navigation season.

Receipts of iron ore and ore agglomerates in February totaled 7,067,832 gross tons, reports the Lake Superior Iron Ore Association. Sources were: U.S. Lake Superior, 475,407 tons; other U.S. ores, 3,367,496; Canadian Lake Superior, 101,313; other Canadian, 129,921; foreign ores (except Canada), 2,993,695 tons.

Consumption in the month amounted to 10,939.448 tons—10,441,687 in the U.S. and 497,761 in Canada. Consumption in the first two months this year was 22,984,396 tons, of which 21,967,391 tons were consumed in the U.S. and 1,017,005 in Canada.

February consumption broke down this way: U.S. Lake Superior ore, 6,748,980 tons; other U.S. ores, 1,476,048; Canadian Lake Superior ore, 350,034 tons; other Canadian, 756,166; foreign ores (except Canada), 1,608,220 tons.

Stocks of ore on lower lake docks and at furnaces on the last day of February totaled 41,643,567 tons. Break down: At U.S. furnace yards, 23,954,921 tons of Lake Superior ore; 3,299,193 tons of other U.S. ores; 1,135,287 tons of Canadian Lake Superior ore; 2,898,412 tons of other Canadian ores; 4,273,606 tons of imported ores (other than Canada); total U.S. furnace stocks, 35,561,419 tons.

Tonnage held at Lake Erie and other U.S. docks: 3,104,960 tons of Lake Superior ore; 187,738 tons, Canadian Lake Superior ore; 613,317 tons, other Canadian ores; total 3,906,015 tons. Combined U.S. and Canadian stocks were: U.S. Lake Superior ore, 28,698,106 tons; other U.S. ores, 3,299,193; Canadian Lake Superior, 1,411,823; other Canadian, 3,910,313; foreign ores (except Canada), 4,324,132 tons.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 248

Reflecting recent increases in coal prices, eastern producers have advanced prices on certain metallurgical and industrial grades of coke to $22.75, ovens, up $1 a ton. Standard furnace coke is $22.

There has been no change in prices of oven foundry coke.

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CLASSIFIED

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CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid. 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

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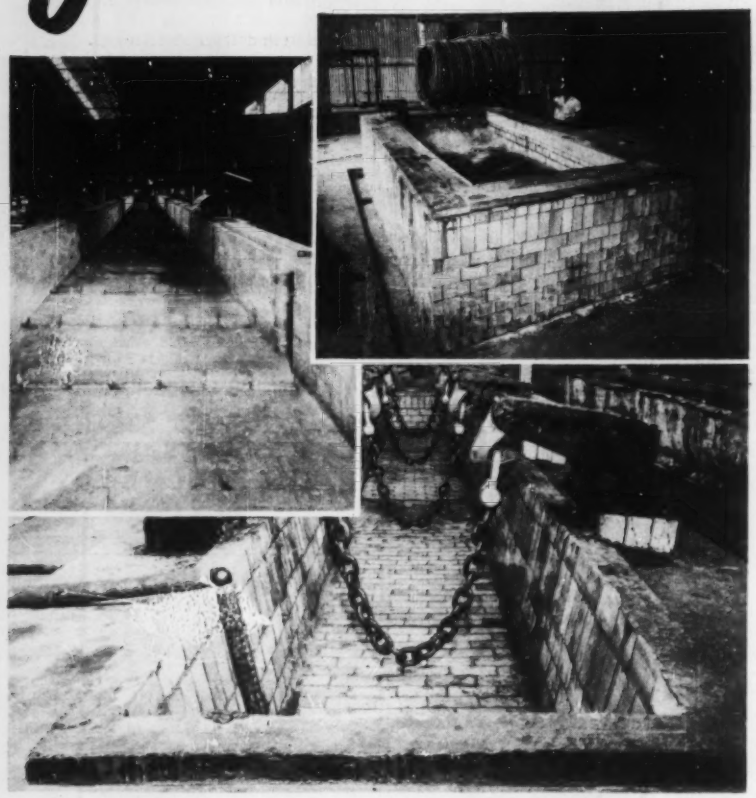

These modern processors of metals pictured above chose Atlas corrosion-proof cements and know-how for the construction of their pickling installations. Their decision was based on Atlas's long recognized experience in the field of Corrosion-Proof construction. From on-the-spot technical advice through complete installation facilities, Atlas can carry the job from beginning to end.

Regardless of your requirements, Atlas is prepared to design and construct any type of installation from the smallest batch pickler to the largest continuous pickling line.

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Write for your copy of Bulletin CC-3 for complete information on the Atlas line.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

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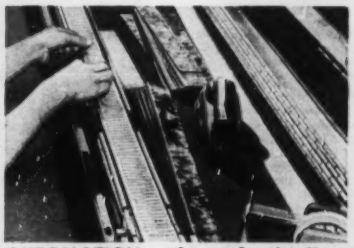
Always specify "SCOTCH" Brand the *quality* tape . . . and *stick* with it!

DOUBLE-COATED . . . *one of more than 300 Pressure-Sensitive Tapes for industry trademarked . . .*

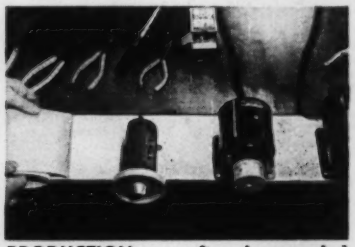
REG. U.S. PAT. OFF.

SCOTCH BRAND

Look what you can do with it!



AUTOMATION on the production line: "SCOTCH" Brand Double-Coated Tape No. 666 secures electrical coils to base plate through subsequent riveting, soldering and assembly.



PRODUCTION can often be speeded with "SCOTCH" Double-Coated Tapes. Above: motors and generators held in place on test bench with double-coated tape. Tape eliminates bolting and unbolting of units.

BONDING, laminating, and splicing operations can often be speeded and simplified with "SCOTCH" Brand Dispenser H-125. Dispenser strips protective liner from tape; rolls it neatly; has built-in cutter.

FREE FOLDER shows many additional ways "SCOTCH" Brand Double-Coated Tapes can save time and money and solve production problems for you. Write on your letterhead to 3M Co., Dept. GK-47.

The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

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Farval keeps pan feeders running smoothly in dust and grime of ore processing plant

FARVAL—
Studies in Centralized Lubrication
No. 201

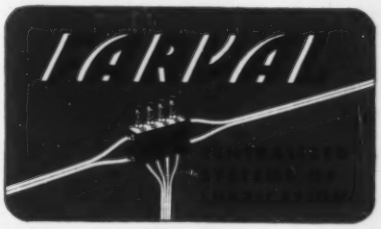
KEYS TO ADEQUATE LUBRICATION—
Wherever you see the signs of Farval—the familiar central pumping station, dual lubricant lines and valve manifolds—you know a machine is being properly lubricated. Farval-lubricated heavy-duty manganese feeder, at work in Hanna's new Hunner plant at Coleraine, Minn., is made by National Iron Co., Duluth.

●No matter how dusty the air and thick the grime, the Farval-protected bearings on this feeder will run bright, unworn and clean for years to come. Serving 37 points of lubrication, this manually operated system is one of five installed recently on pan feeders for ore processing plants in the Iron Range of Minnesota.

Farval centralized lubrication is the ideal method—not only of protecting bearings, but of insuring continuous operation of vital industrial equipment. With Farval on the job, there's no shutdown for lubrication, no work stoppage for bearing repair or replacement. Frequently, this time-saving feature alone can soon pay for a Farval installation in the value of increased machine output. And in addition there are worthwhile savings in labor and lubricant.

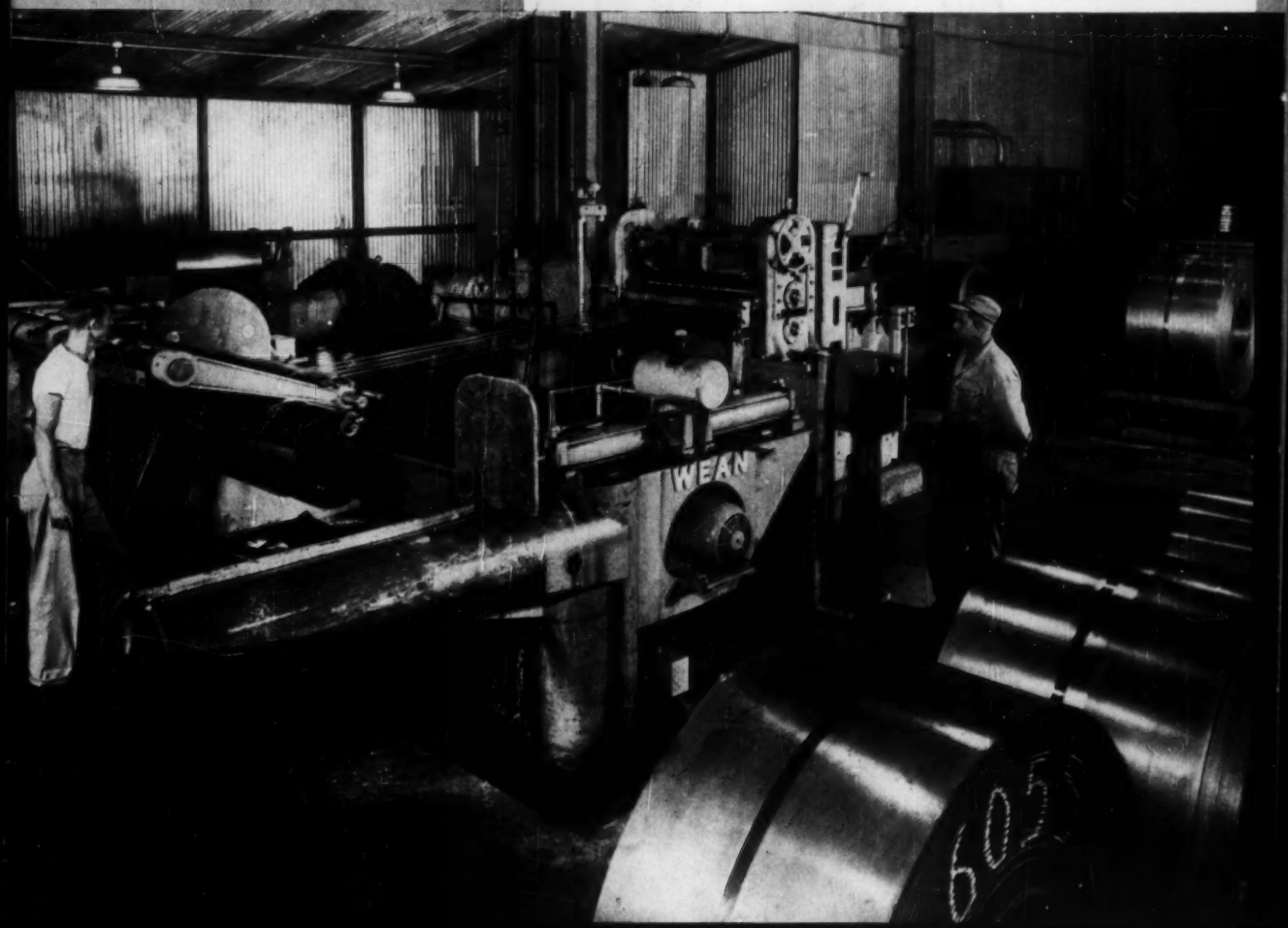
There are thousands of Farval automatic and manually operated systems in use, serving millions of industrial bearings. Millions more *need* Farval. If you have a machine that could benefit from better lubrication, write for our Bulletin 26-S. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

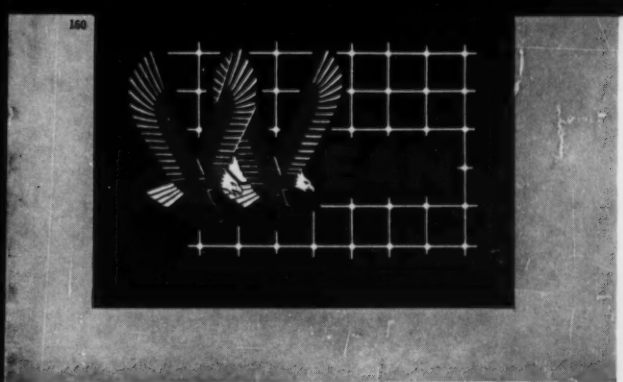
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
In Canada: Peacock Brothers Limited.



Slitting is faster, more accurate because of

WEAN CREATIVE ENGINEERING





● Wean high speed slitting lines are being used by more and more of the nation's steelmakers because they are engineered to perform the most accurate slitting job at cost reducing speeds. And, auxiliary coil handling equipment is designed to keep the steel moving — to get maximum production from the line at all times.

If slitting is part of your operation, get the last word on high production slitting from Wean engineers before you buy.

THE WEAN ENGINEERING COMPANY INC., WARREN, O.